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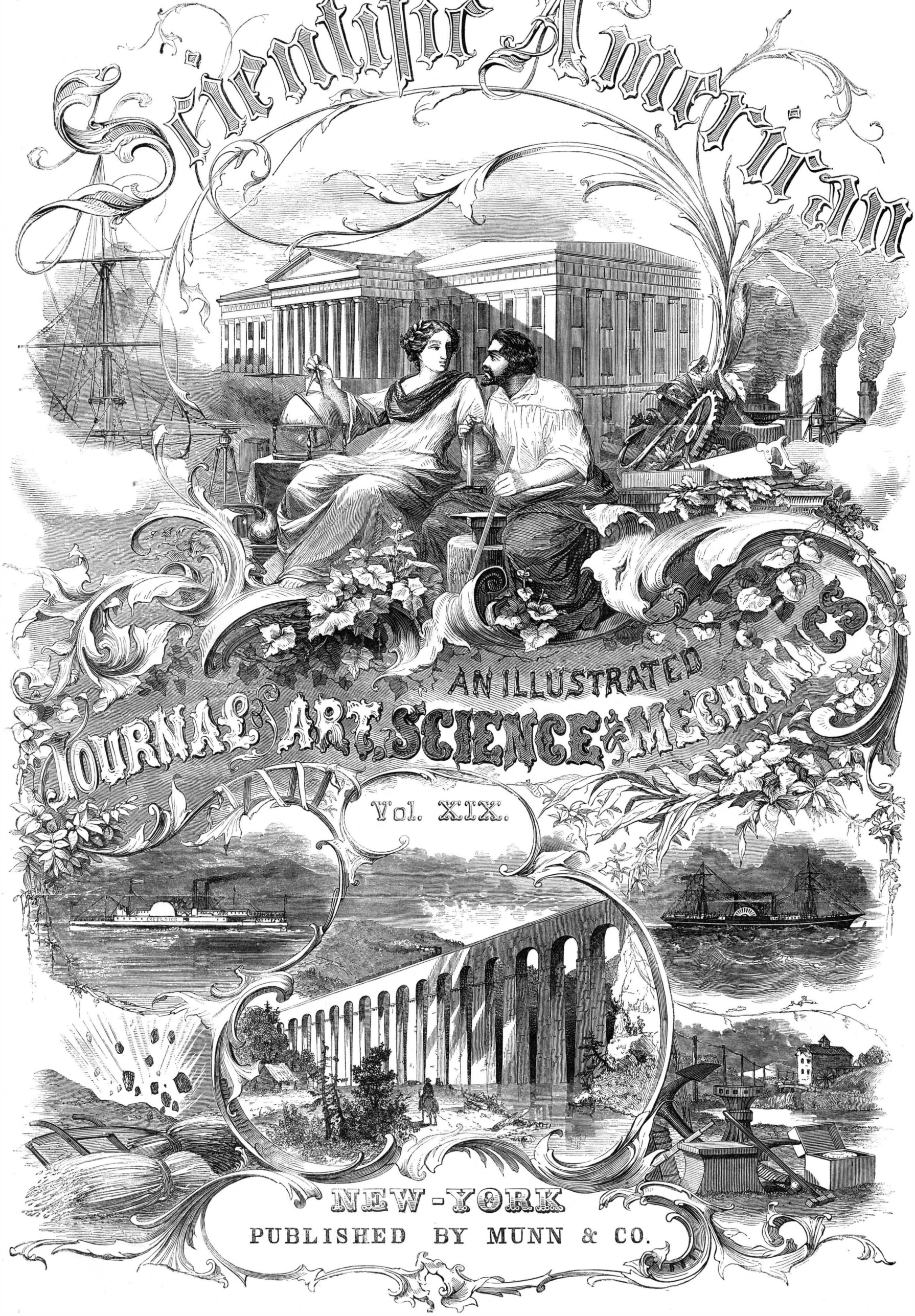

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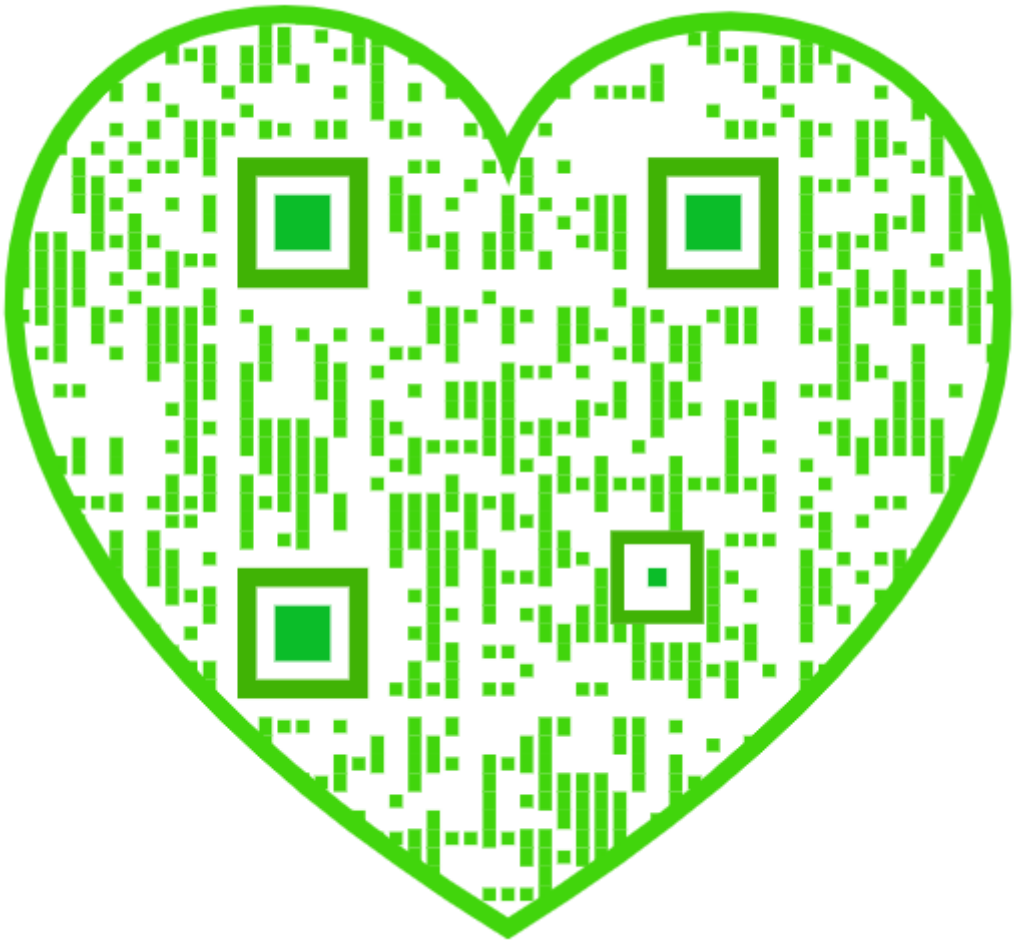

SCIENTIFIC AMERICAN

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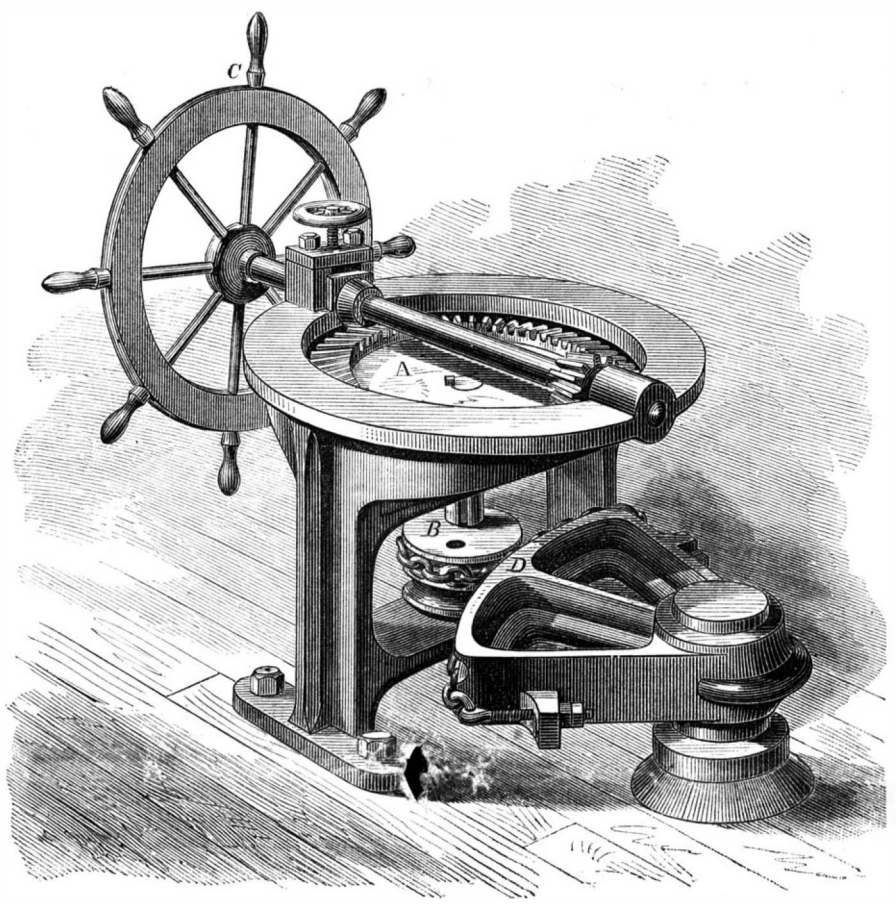
Improvement in Steering Apparatus for Vessels.

The engraving shows a very simple steering apparatus, entirely different in its construction and operation from the right and left handed screw, and also from the geared machines often used. In the action of a gear in connection with a pinion, this does not materially differ from other devices; but in the connection with a cam wheel and depressed quadrant, it affords a beautiful exhibition of the adaptability of mechanical powers.



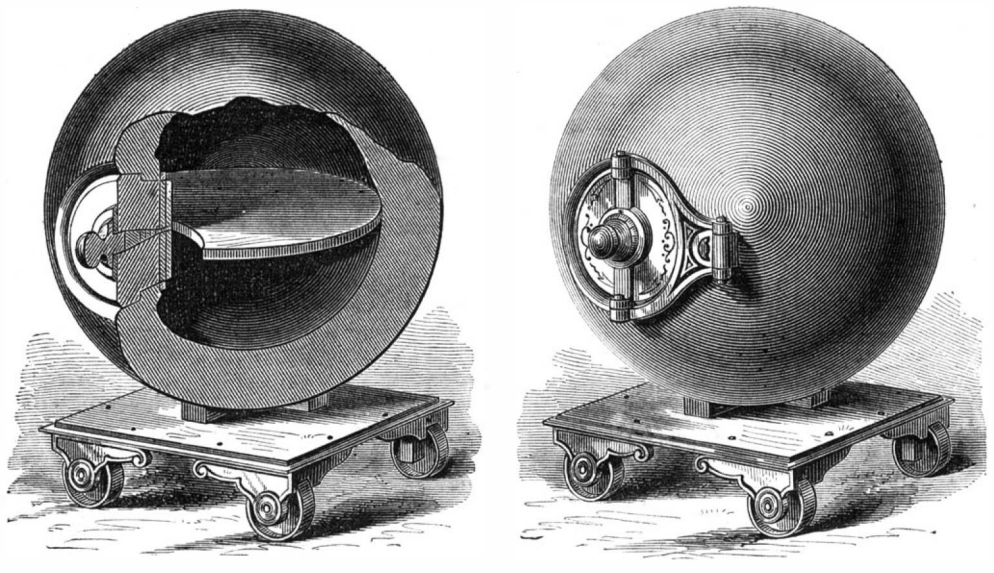
NORTH'S PATENT STEERING APPARATUS.

Attached to the upright shaft that carries the bevel gear, A, is a cam, B, having two grooves on its periphery for the reception of chains or ropes. This cam has a feather or key that will allow it to traverse the upright shaft, while always acting with its rotation. The gear wheel and the cam are rotated by means of the pinion on the horizontal shaft that carries the steering wheel, C. This simple machinery is mounted on a frame, as seen, bolted to the deck of the vessel. On the rudder post is secured a quadrant, D, so depressed in its periphery to correspond with the eccentric action of the cam, B, in its rotation, as always to present the same face, or radius, to its action. This segment has also two grooves for the reception of the steering chain or rope, corresponding to those on the cam. In operation, it will be seen, it is easily understood. When the rudder is "hard-a-port," or "a-starboard," the quadrant presents its longest radius to the shortest radius of the cam, and although the pressure on the rudder is greatly enhanced, the labor of the wheelman is not increased; while the change from one of these points to the other can be made very easily and rapidly, as there is an increasing speed without additional labor, in consequence of the combined action of the cam on the upright shaft, and the cam-like surface of the quadrant on the rudder head. To secure the rudder at any point, the hand wheel over the box next the steering wheel may be used, which compresses the upper box and increases the friction. The feather and slot in the cam and on the wheel permits a lifting of the rudder without disarranging the connections or breaking the parts. This device has received the highest commendations from sailing masters and sea captains, several of which we have read. It has been thoroughly tested during the three years it has been in practical use, and has always proved satisfactory.

It was patented June 6, 1865, by Albert H. North, who may be addressed for the sale of the entire right at New Britain, Conn. Applications for apparatus to be made to the Bridgeport Iron Works, Bridgeport, Conn.

Improved Burglar-proof Safe.

It is generally conceded that safes for the reception of valuables and papers can be made to withstand the action of fire under almost any circumstances; but the burglar has hitherto defied all attempts to make the safe secure against his systematic attacks, especially if time enough was allowed him for his operations. In the great trial at the Paris Exposition, less than five hours sufficed for the opening of the burglar-proof safe submitted for competition. The sledge and wedge in skillful hands proved superior to bolts, combination locks, and hardness of material. Marvin & Co., the well-known safe manufacturers, have just contrived a safe which they allege to be perfectly burglar-proof. It is shown in the accompanying engravings, of which one is a perspective and the other a partially sectional view. The material of the safe is the well-known chrome iron, the ore of which occurs in masses and crystallized, and is so hard, when melted and cast, that no tool known to the mechanic can penetrate its structure. It can be worked only by the abrasion of grinding. In form the safe is a globe, hollow, and resembling a spherical mortar shell, the opening for the fuse forming the aperture for the door which fits air-tight, being ground to place.



MARVIN'S CHROME IRON SPHERICAL BURGLAR-PROOF SAFE.

The safes are made of various sizes and may be placed in vaults or in the ordinary fire-proof safe. The thickness of the metal varies according to the diameter of the safe, being in some instances four inches thick. Its form, that of the double arch or perfect sphere, makes it impervious to the heaviest blows of the sledge. The door being fitted on a series of tapers and shoulders, as seen in the section, precludes the use of wedges or chisels; and being built of wrought iron and the best hardened steel, it cannot be chipped or drilled. The lock spindle is also made of hardened steel and of tapering form so that it cannot be driven in. Each safe is furnished with one or more shelves, seen in the sectional view, and a patent combination lock.

By the use of this safe, banks, insurance companies, and merchants may be assured of security for their valuables. A number can be placed in a fire proof vault, each officer or proprietor having one for his special use.

This safe was patented March 19, 1867 Orders may be addressed to Marvin & Co., 265 Broadway, New York, city, 721 Chestnut street, Philadelphia, or 108 Bank street, Cleveland, Ohio.

A Vine-Growing Town.

The town of Los Angeles, Cal., claims to be the greatest grape-raising locality in North America. The county bearing the same name is certainly the most thrifty, as well as populous, section of the Golden State; its fertile fields last year producing from 14,000,000 grape vines, 1,500,000 gallons of wine and 100,000 gallons of brandy. Twenty-five miles from the town of Los Angeles is Anaheim, a village of eleven years' growth, in the center of what is rapidly becoming a most important wine-growing district. The California correspondent of the *Boston Journal* gives this history of the settlement, as illustrative of what may be done by the well-directed efforts of poor men:—

The site where the village now stands was in 1857 a dry, barren plain—just such as to-day extends around it for miles. In the summer of that year a company of Germans, acquainted with the culture of the grape in the "fatherland," purchased 1,265 acres of the plain at $2 per acre, to test its capacity for producing the grape. The land was divided into fifty rectangular lots of twenty acres each. A town was laid out in the center, with sixty building lots—one for each shareholder, and ten for public purposes. These twenty acre lots were fenced in with willows and sycamores, and ten acres of each planted with vines. A ditch seven miles long was cut, to bring water from the Santa Anna River. The land for two years was carried on by joint labor. Then the lots were distributed to the shareholders. Reckoning the labor and expense of the stockholders, each share, with the outlay for vines, cost $1,400 to each owner. This included one of the twenty-acre lots, with a town lot 100 by 200 feet. Each of these shares is now worth a small fortune to the owner, and will be worth a great deal more in a few years. There are 1,200,000 vines growing in the village, 800,000 of which bear fruit. There are also 10,000 fruit trees of various kinds, the whole place resembling a forest and flower garden, divided into squares with fences of willow and sycamore. Nearly every lot has a comfortable homestead, and the inhabitants of the village number 460. There is a good public school, four stores, a post-office, but neither lawyer, doctor, nor minister. There are hundreds of places in these southern counties where such villages might be founded with equal or even greater advantages.

A Wonderful Skull.

Nearly twenty years ago the medical journals of the world recorded a most singular case of a laborer in Cavendish, Vt., who while engaged in blasting had a tamping iron blown entirely through his head but who actually recovered within sixty days. Such a surprising and unprecedented result at the time of its announcement was generally disbelieved, and provoked great discussion, many eminent surgeons pronouncing it a physical impossibility, but the subsequent public exhibition of the individual himself, convinced the most skeptical, and verified the first report of Dr. John M. Harlow, the attending surgeon who published the case. At a very recent meeting of the Massachusetts Medical Society, this gentleman read a paper giving a history of the case, and presented to that body, the veritable skull which sustained the injury.

The accident occurred on September 13th, 1848, and was caused by the tamping iron striking fire from the rock, exploding the powder and driving the bar, which was nearly four feet long by one and one-quarter inches diameter, and weighed thirteen pounds, through his head; entering under the cheek bone, passing inside an inch behind the eye and out of the top of the head in the center, two inches back of the line where the forehead and hair meet. The opening in the skull was two inches wide by three and one half inches long, and the brain was hanging in shreds on the hair. In fifty-nine days the patient was abroad. Soon after, with his tamping iron—which he carried with him until the day of his death—he was exhibited in Barnum's old museum, this city, and several years after he left this city for South America. His general health appears to have been good until 1859, when it began to fail. At that time being in California, he was taken with epileptic fits which finally caused his death in May, 1861, twelve years and eight months after the accident Dr. Harlow kept himself informed as to the history of his patient, and on his demise obtaining possession of both the skull and the iron, made the disposal of the same as mentioned above.

The effect of the injury upon the man seems to have been the destruction of the equilibrium between his intellectual

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faculties and the animal propensities. He became capricious, fitful, irreverent, vacillating, impatient of restraint, a child in mind, an adult in physical system and passions. During his South American life he was a coachman, and underwent great hardship. It appears the man could see out of his left eye though the lid was not subject to his will. In summing up his paper Dr. Harlow presented these views:

1st, The recovery is attributed solely to the vis vitæ, vis conservatrix, or, if some like it, vis medicatrix naturæ. 2d, This case has been cited as one of recovery; physically the recovery was nearly or quite completed for the four years immediately succeeding the injury, but ultimately the patient succumbed to progressive disease of the brain. Mentally the recovery was only partial; there was no dementia; intellectual operations were perfect in kind, but not in degree or quantity. 3d, Though the case may seem improbable, yet the subject was the man for the case, as his will, physique, and capacity for endurance, could scarcely be equaled; the missile was smooth and pointed, dilating and wedging off rather than lacerating the tissues; the bolt did little injury until it entered the base of the brain, and that opening served as a drain for the blood and matter and other substances that might have caused death by compression; the part of the brain traversed was the part that could best stand such a shock with the least injury.

VEGETABLE COLORING MATTER.

Until within a recent period, most colors used in calico printing, paper staining, dyeing, etc., were chiefly obtained from vegetable sources. Mineral dyes, however, have been much in favor, and have the advantage, where they can be used, of being lasting and easily applied. Some of these thus used, and also as pigments, have been described in our previous pages; we shall, therefore, here chiefly direct attention to colors of a vegetable origin.

The natural colors of leaves and flowers are due to a peculiar principle which is subject to the action of heat, light, and chemical action, but which is lost on the death of the plant. It is there a vital principle only. Colors employed for dyeing, etc., are extracted from the plant after its vitality has ceased, and are resident in the leaves, stems, roots, and flowers. Red dyes are obtained from madder, or rubia tinctorum, safflower, or carthamus, Brazil wood, logwood, sapan wood, the cochineal insect, etc.; blue colors are afforded by indigo, archil, litmus, etc.; and yellow dyes are produced from fustic, turmeric, saffron, etc.

But all these colors *per se* are fugitive, and require a *mordant* to fix them in the fabrics to which they are applied. The action of a mordant is readily illustrated by that of iron and an infusion of logwood used in dyeing black. If a piece of cotton were simply dipped in the infusion of logwood, it would only acquire a dirty red-brown color; but if it be first soaked in a solution of sulphate of iron, the oxide of the metal attaches itself to the fibers of the material, and, on being introduced into the logwood infusion, a black and permanent color is produced. The mordants usually employed are salts of iron, alumina, and tin, others being used only to a limited extent.

Madder is chiefly employed in dyeing red. It is the root of a plant, and is imported into this country from the continent in a state of powder, having a dark red color. From it a peculiar principle, called *garancine* is produced by means of sulphuric acid. This preparation is superseding the use of the raw madder, because it is more economical, cleanly and effective. Other principles may be extracted from madder, such as *purpurine, alizarine, xanthine*. etc., of which the alizarine is the most important, because it is really the coloring principle of the rest, and is the chief constituent of the garancine of commerce. The celebrated Turkey-red dye, which withstands the action of most chemical substances, is obtained by means of madder.

Cochineal is properly an animal dye, but its coloring powers are due to the cactus, on which it feeds. With alumina, a decoction of the insect affords a rich red color, used in dyeing silk, and in producing "carmine." We have succeeded in producing some rich red precipitates from a cold infusion of the cactus flower and solutions of carbonate of soda and citric acid, employed in the manner we are about to describe in connection with safflower.

Safflower is a kind of saffron, and affords two coloring principles—a yellow and a red—the former being abundant and useless, while the latter is obtained only in small quantities, and is very valuable as a dye for silks, producing reds of the purest color and of every shade, from pink to deep poppy.

The safflower must be washed in cold water, until all the yellow color is removed. The residue of solid matter is then to be steeped in a solution of carbonate of soda, also cold; and, after some time, cotton wool is to be introduced so as to absorb the color. It will appear of a muddy red tint; but on the addition of a solution of citric acid, or lemon juice, a magnificent red color is afforded. By a repetition of this process the cotton may be filled with color, which can afterwards be removed by the same means as those just employed. The color is thus obtained isolated. A large quantity of the color is manufactured on the banks of the Lea, near London; and also near Paris. The winter months are chosen for the purpose, as the heat of summer spoils the tint. From the small quantity of color produced from the raw material, it is very expensive, and its use is chiefly confined to dyeing silks, and making "carmine saucers."

Decoctions made by boiling the chips of Japan, Brazil, and logwood, afford a red color, with tin and alum as a mordant; and a black with salts of iron. These substances are chiefly used for dyeing wool and cotton yarn. Each of them contains some tannic acid, as do sumac, gall nuts, oak bark, walnut peels, etc.; and such with iron, afford black dyes of various depths.

Yellow colors are produced by the action of alumina, as a mordant on infusions of turmeric, etc; but these colors are generally fugitive. Intermediate tints of brown, maroon, etc., are produced by successively dyeing the stuffs a yellow and red color, until the desired tint be arrived at.

Blue vegetable colors are obtained from some lichens, amongst which the *rocella tinctoria* is that most commonly used. All the lichens, however, afford colors of some kind and even those of a yellow and red tint. Archil, used in dyeing silk, is obtained from the *rocella* by means of ammonia, or more economically, urine, which has so far undergone decomposition as to afford ammonia. From these plants peculiar coloring principles, such as *orcine*, etc., may be obtained, which are analogous to garancine, alazarine, etc.

Indigo has, until the discovery of the production of aniline from coal-tar, been the chief source of the permanent blue of the dyer. The color from indigo is not obtained, as in most other cases, by infusion or decoction in water, but by means of the strongest sulphuric acid. The raw material, as imported, is in blue colored cakes; these are powdered, and to them the strongest sulphuric acid is added. By this, the real principle of indigo is dissolved out. The principle of dyeing with this substance is that of first deoxidizing it, which is done by means of the proto-sulphate of iron. This renders the indigo in a state fitted for absorption by the fabric, which, after being dipped into the solution, becomes of a deep blue color on exposure to the oxygen of the air, and the color then becomes permanent. In the process, the alkaline earth, lime, is used with the proto-salt of iron. And this introduces us to the production of aniline from a vegetable, as we have shown its production already from coal tar.

If indigo be acted upon by a hot solution of potassa and then distilled, analine is produced as a nearly colorless liquor. It is highly volatile, soluble in water, and on being oxidized by chromic acid, affords a rich purple tint. It matters not what it is produced from, for it is equally obtainable from indigo, nitro-benzole, and coal tar. And this is a matter of not only deep philosophical interest, but, in the uses to which it is applied, has become a most important article of commerce.

Into the varied treatment which this substance undergoes, we of course cannot enter; and we have made our remarks more extended on it than we should have done, solely because it affords an instance of a most remarkable practical application of purely scientific research, and which we are glad to say has been the means of enriching those to whose perseverance we have been indebted to its manufacture in quantities.

CUTLERY.---UNITED STATES INDUSTRY.

The Manufacturer, a London publication, has the following article on our cutlery manufactures, which is worth reading:

The manufacture of cutlery in the United States is of recent origin, comparatively. But a few years since the whole supply came through the hands of the importer from Europe; but the production of edge tools and cutlery was no sooner started than it took a rapid growth, and a foreigner, remarking upon branches of American industry, says—"The manufacturers of cutlery have far surpassed those of the Old World in the production of tools, and that not merely in the excellence of the metal used, but especially in the practical utility of the patterns, and in the remarkable degree of finish of their work." This is a just remark. The "high finish" of American work is applied only, however, where it has utility, not where it is a useless expense. This may be illustrated in watches and clocks. The English have highly polished works that add much to the expense but nothing to the service. In the American article this expense is saved. A peculiarity of American work is the readiness with which improvements are perceived by the intelligent worker, and immediately adopted and applied. This intelligence comes in some degree from the entire freedom of industry, and the absence of all trade "guilds," unions, or restrictions. The American who travels in Europe is struck with the, to him, ludicrous mystery with which every species of handicraft is surrounded. It would seem as if the proprietor of every petty workshop or factory was exclusively possessed of the philosopher's stone, which would be robbed from him by the prying gaze of every transient visitor. The apprentices are only taught the routine of centuries, and only so much as is necessary to fulfill the part of the labor required of them. The manufacture itself, whatever it may be, is divided into branches, each of which is in charge of persons who preserve their supposed secret from the other branches. Under these circumstances the apprentice succeeds with difficulty in becoming a master of his trade. When out of his time he must travel for three years, and when he returns to his native town he must have money and interest to be made a citizen, and then admitted as a member of the guild or trades' union before he can pursue, except as a journeyman, the trade he has learned. How different is all this in the United States! The boy enters a factory, or workshop, and is taught his especial work, and has within his reach every branch of information, scientific and practical, connected with the whole of it. His fellow workmen are experienced in all the branches and with the best modes in use in all countries. His employer is wedded to no system or rule, but is ever on the alert for improvement; always ready to suggest and hear suggestions, and to adopt feasible ones. It is no wonder that in such an atmosphere the arts should flourish, and that an observant foreigner should exclaim, as above, that hardly twenty years of experience in the New World should have surpassed the centuries of progress in the Old World. This branch of industry thrives mostly in individual workshops; it has not come within the sphere of corporate influences. There is a general and very perceptible adoption of American patterns not only in Europe, but in England, as being more practical, and it is stated that in American factories already there is more English steel used than in England itself. The American worker does not believe in using poor tools when good ones are to be had.

Steel is the material used, by reason of its hardness, for cutting edges of tools and cutlery. The backs are made of iron, as a cheaper material; so also are the handles or "tangs" to which the steel is welded. The steel is blistered as, or after, it is drawn down by tilt hammers into shear steel. This is used for table knives, scythes, etc. When a fine finish is required, or great hardness, the blistered steel is melted into cast steel, and the ingots are forged into bars. Simple articles, such as chisels, are made by hammering a bit of cast steel into the required shape. This being intended only for the edge, is made very thin, and upon it is welded a flat slip of iron which has been forged into the shape of a chisel, with a shoulder formed by driving it into a hole in the anvil. One side of the chisel is, therefore, iron, intended to be ground away, and the other steel. Scissors are made of various materials. Common ones are shear steel, with the blades hardened. Tailors' shears have the blades only steel; the remainder is iron. Formerly only the edge was steel. Some scissors are made of good cast iron, called run or virgin steel. Of these many are sold at seven cents a dozen. There are some, on the other hand, made with bows or shanks of gold, and sell for fifty dollars a pair. When made wholly of steel, the blade is hammered out at the end of a small bar; it is then cut off with enough to form the shank and bow. A hole is then punched, the instruments shaped, united by a screw, ground, filed, and burnished. The blades are slightly bowed in such a manner that they touch each other only at the point of cutting, and this point moves as the blades close in the act of cutting from the pivot to the point. This operation is seen by holding a pair of scissors, edgeways, to the light. This action gives smoothness to the cut.

The manufacture of table cutlery is of recent introduction in the United States; and it has made progress by reason of the American invention of a machine to form the blades, which invention has been adopted in Europe. In the old process the blade of a table or other large knife is hammered out on an anvil at the end of a bar of steel, and cut off. It is then welded on to the bar of wrought steel, about half an inch square, and enough of this is cut off to form the bolster or shoulder, or the tang. The blade is then heated and hammered, or, as it is called, smithed, which serves to condense the metal, and enable it to acquire a higher finish. The mark of the maker is then stamped upon it, and it is hardened by heating to redness, and plunging it into cold water. It is tempered to a blue color, and is then ready for grinding. The small blades of penknives are hammered entire out of the best cast steel. A temporary tang is drawn out to secure the blade while it is ground. A number of blades are heated together for tempering by being placed over the fire, upon a flat place, their backs downwards. When at the proper degree of redness, so as to take a brown or purple color, they are dipped into water up to the shoulder. For razors the best cast steel is selected, and when the blade is shaped upon the anvil, from a bar as thick as the back of a razor, and half an inch wide, it is well smithed to condense the metal. Only the best metal will bear the working down of the one part of the blade to the requisite thickness, while the other is left thick. The shape is further improved by grinding on a dry, coarse stone. The tempering is performed after the blade is drilled for the pin of the joint, and stamped. It is then ground and polished.

The grinding and polishing of cutlery are conducted mostly by wheels constructed for the purpose. There is a trough with a stone for grinding and a polisher driven by a pulley. The stones vary in diameter from four inches to two feet, according to the articles to be ground. The convex surface of the small wheels gives the concavity on the blade of the razor, and the other wheels suit the various sizes and shapes of the articles polished. Some are used dry and others are kept wet, in order that the heat engendered by dry grinding may not injure the temper of the articles ground. The dry grinding is more expeditious, but, unless the troughs are furnished with a ventilating fan and flue for carrying off the fine metallic particles and dust from the stones, the health of the worker suffers. This flue is constructed of tin, in the shape of a sort of cap, that comes over the back of the stone; the other end of the flue is in an adjoining room, and has the air partly exhausted from it by a fan in rapid motion. This creates a strong current, which, when the stone is in motion, carries the dust and filings from it into the flue. When the grinding is completed, lapping succeeds. This is done on a thin wooden wheel, faced with a tire of metal made of five parts of lead to one of tin, and cast upon the edge of the wheel. It is then turned true and indented, so as to hold a dressing of oiled emery of different degrees of fineness. The steel blades receive various degrees of polish by drawing them from end to end across the revolving lap, which is fed with emery of various sizes.

The handles of cutlery are made of a variety of substances, ivory, horn, mother-of-pearl, tortoise shell, cocoanut, maple wood, etc. Ivory is mostly used for table knives. A solid piece is cut out of the right size, and a hole for the tang bored at one end. This is sometimes carried through, so that the tang may be visible. When it does not go through the tang is secured by cement. By a late contrivance, a little spring is attached to the tang which falls in a notch in the cavity of the handle, and prevents it from being withdrawn. Balance handles are made by introducing lead into the handle, to counterbalance the weight of the blade. The handles of penknives are complicated. The springs must be nicely ad-

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justed, requiring a peculiar temper. The slips for the handles require great care in fitting. It is stated that a three-bladed knife passes through the finisher's hands a hundred times.

The manufacture of butcher and shoe knives is large in the state of New York. The state census gives it at 35,000 per annum, and these have a wide reputation.

The manufacture of forks is said to be one of the most unhealthy of the mechanical arts. It has been estimated that the destruction of life in it is greater than in any other pursuit, by reason of the fine dust evolved in the process of grinding, and which fills the atmosphere of the rooms, and invades the lungs of the operators. This takes place in the finishing. The forks are hammered out of square steel rods three-eighths of an inch thick. The tang and shank are roughly shaped at the end of the steel rod, and are then cut off, with about an inch of the square steel besides. This is drawn out flat for the prongs, and the tang and shank are then shaped by the dies. The other end, heated to a white heat, is laid in a steel die upon an anvil, another die attached to the under face of a heavy block of metal, is allowed to fall upon it to a hight of seven or eight feet. The prongs are thus shaped, and all but a thin film of steel removed from between them. This is cleared out by a machine called a fly press. A number of forks are collected together, and annealed by heating and allowing them to cool slowly. They are now sufficiently soft to be easily shaped by the file, and by bending. They are then heated to redness and suddenly cooled, by which the hardness is restored. The process of hardening renders all steel brittle, and it is intended to remove this by tempering. The higher the heat when the metal is hardened the softer and stronger will be the steel. A lower degree of heat gives more hardness and also more brittleness. The temper is indicated in the color, and temperature which produces that color follows a regular scale. Thus 430° of heat gives a very pale straw color, suitable for the temper of lancets. Higher degrees of heat gives darker shades of yellow, suitable for razors, penknives, and chisels; until at 500° the color is brown yellow, adapted to axes and plane irons. Twenty degrees higher the yellow has a purple tinge, seen in table knives. Thirty degrees higher the dark color of a watch spring is obtained. Again twenty degrees the dark blue of saws is visible. At 630° the color has a tinge of green, and the steel is too soft for instruments. This color is supposed to be produced by the action of the oxygen of the air upon the carbon of the steel, and protects the metal from rust in some degree.

One of the most necessary tools for a new and agricultural country is the ax. The remains of all lost races generally disclose, in some rude form, that useful instrument; and the modern nations of Europe present it in an improved metallic form. The Spanish ax, which has no head, is made by hammering out the bar and turning it into a loop to make the eye. The manufacture of the ax has, however, like its use, been carried to its highest perfection in the United States. An American ax has a fame co-extensive with an American backwoodsman, who alone of all the nations that visit this continent is fitted to struggle with the mighty forests with which the country was covered. While the American pioneer, ax in hand, boldly buries himself in the forest to clear and subdue it, the European rather keeps to the plains as more easily managed. The experience in the use of the ax, and the various uses to which it is applied, have combined to produce great varieties, all of which have undergone considerable improvements. Formerly, the operator depended upon the rude forges and limited skill of blacksmiths to supply axes. With the improvements that suggest themselves, special factories sprang up, and the largest factory of the kind in the world is in New England. There, 1,200 tuns of iron and 200 tuns of cast steel are by machinery wrought annually into tools. In the most recent process hammered bar iron is heated to a red heat, cut off the requisite length, and the eye, which is to receive the handle, punched through it. It is then re-heated and pressed between concave dies until it assumes the proper shape. It is now heated and grooved upon the edge to receive the piece of steel which forms the sharp edge. To make the steel adhere to the iron borax is used. This acts as a soap to clean the metal in order that it may adhere. At a white heat it is welded and drawn out to a proper edge by trip hammers. The next process is hammering off the tool by hand, restoring the shape lost in drawing out; it is then ground to form a finer edge. Afterwards it is ground upon finer stones, and made ready for the temperer. The ax is now hung upon a revolving wheel in a furnace over a small coal fire, at a peculiar red heat. It is cooled successively in salt and fresh water, and then tempered in another furnace, where the heat is regulated by a thermometer. It is then polished to a high finish, which will show every flaw and enable it to resist rust. It is then stamped, and the head blackened with a mixture of turpentine and asphaltum.

The manufacture of scythes has reached a high state of perfection in the Western States, and the patterns have been imitated to a great extent in Europe.

The manufacture of surgical instruments has become large in the cities, mostly in Philadelphia, where the manufacture has acquired great celebrity. The ingenuity and skill with which an infinite variety of instruments is adapted to the purpose of operations upon the living fibers of the body are marvellous in their way. The quantities supplied to the West and South are large.

WHEN the head of a cold chisel has been battered, so that the steel "rags" over the edge, the edges of the head should always be ground off. The "ragging" is very hard and flinty, and apt to fly at the blow of the hammer, and a particle lodged in the holding hand, is an uncomfortable companion,

CAST-IRON WORKING IN SCOTLAND.

We condense from the *Ironmonger* some interesting information respecting the manufacture of cast-iron wares at the Carron Iron Works in Scotland. These works were established in 1759, by Dr. Roebuck, who employed James Watt to erect a large steam engine, which was merely used to pump back into a reservoir the water that had passed over the water wheels, and so enable it to be used again and again to drive the machinery, instead of applying the engine direct for that purpose.

It appears that the Carron Company employs about 2,000 men and boys, who are well cared for and contented, and there is no trouble with them in the way of strikes or trade disputes, which is not to be wondered at as the Company takes a deep interest in all that concerns the welfare of the operatives, who have benefit societies, the most important one of which has been in operation for several years, and holds an interest in the Company.

THE PROCESS OF MOLDING.

Take, for example, a three-legged pot, the patterns for which consist of nine pieces, two for the body, three for the feet, and two for each of the ears. The body pieces have been formed by taking a completed pot, denuding it of feet and ears. These pieces the molder takes, and placing the severed edges together, lays them down on his bench with the bottom upward. He then incloses the pattern in a circular casing, which he fills up with sand. The sand is rammed down all round and over the pattern, care being taken during the process to insert the feet pieces, and also a wooden plug to form a "gate" through which to pour the metal. The molder then turns the box over and fills the inside of the pot with sand. The next part of the operation is to take out the pattern and leave open and entire the space it occupies. The advantage of having the casing and pattern in sections now becomes manifest. The upper section of the casing is unfastened and taken off, when it is seen that the sand bears an impression of the bottom of the pot. The side pieces are in like manner removed, leaving the body pattern clear. The latter is carefully lifted off, one half at a time, exposing the "core" or globular mass of sand which represents the interior of the plot. The whole surface of the sand is next thickly dusted with ground charcoal, and rubbed quite smooth—a process which makes the iron take a finer "skin" than it would otherwise do. The feet and ear pieces having been withdrawn, all that is now necessary is to put the casing together again, fasten it tight up, and prepare the "gate" by pulling out the plug and rounding off the edges of the hole. So compact does the sand become that the completed mold may be moved about freely without sustaining injury. An expert hand can mold a pot of the largest size in from fifteen to twenty minutes. After a certain number of molds have been prepared, the workmen proceed to "cast" them. The molten metal is carried from the furnaces in huge ladles, and appears to be as fluid as water. When it is poured into the mold, gas is at once generated, which finds its way through the sand, and issuing from the joints of the casing, become ignited, and burns with a beautiful purple flame. Were this gas not allowed to escape, the mold would burst, and the consequences to the workmen would be most disastrous. It is a curious fact, that while a few drops of water would ruin a mold, the boiling metal may be poured in from a hight of a couple of feet without disturbing a particle of the sand.

When the metal has cooled sufficiently, it is dug out of the sand and taken to the dressing shops, where roughnesses are removed. Articles cast in several pieces are then carried to the fitting shops, where they are put together. Kettles and stew pans, which are to be tinned, are first annealed, and then passed to turners, who put a smooth and bright surface on the inside. The tinning is then done, the handles put on, the outsides jappaned, and the completed goods removed to the warehouse. Portions of many of the articles are of malleable iron—such as the handles of kettles and pans; and in the making of these a large number of smiths are employed. The division of labor system is extensively applied in the works, and the result is that the men in the various departments display extraordinary expertness. When a boy enters on his apprenticeship, he chooses, or has chosen for him, the branch of work that he is to follow, and to that he adheres. Let us suppose that a boy selects pot molding. After some preliminary training he is intrusted with the making of pots of the smallest size. As he advances in years, so does the size of his pots increase; and by the time that gray hairs come, he finds his hands employed upon vessels so capacious that each might contain a dozen of those he made in his early days. This is one of the peculiarities of life at Carron; and though it looks as if designed to remind the men of the flight of time and the growth of years upon them, it is simply the result of promotion by seniority. The mold for a small pot requires nearly as much time to make as that for a large one; but there is a difference of price in favor of the latter, and these the older hands claim the privilege of making. Another peculiarity of the pot-making branch is the mode of payment, which is this: a man agrees to make a certain number of pots for half a crown, and he is allowed one shilling of premium on every hundred that he produces. Taken altogether, the men employed in molding make higher wages than those in the other departments, and it is no unusual thing for one of them to receive even as much as £3 for a week's work; but the general wages of the class may be set down at about twenty-five shillings for sixty hours' work.

ARTISTIC WORKS IN CAST IRON.

The Carron Company has devoted much attention to the production of cast iron goods of an artistic kind. When any new article is to be produced, a drawing of it is first made, and from that a modeler forms a pattern in wood, wax, or plaster. From the pattern a cast is taken in tin, a metal which takes a smooth surface, and from the tin copy, which is nicely chased up, the molder makes the impression in sand from which the iron is cast. A smoother surface is thus given to the iron than would be the case were a wood pattern used. In all cases, the details of the pattern are sharpened in the iron, after casting, by filing. Though no model seems to be too difficult for the molder to make in one piece, yet, as a matter of convenience, most articles of any size or complexity are made in several pieces. In the molding shop, in which the ornamental castings are made, we had an opportunity of seeing sand molding of the most difficult kind; but the operations of the workmen would require to be seen to be understood. A specimen of work from this shop was shown at the Exhibition of 1862, along with a variety of other castings, and excited a good deal of interest, as showing the capabilities of the sand-molding process. It was a small figure of a stag browsing; and, in order to cast it in one piece, the mold had to be made in upwards of one hundred parts, each part being simply a clod of moist sand, held together by compression.

CAPABILITIES OF CAST IRON.

It would appear that the capabilities of cast iron have not yet been fully developed by the ironfounders of the country. At the Paris Exhibition were shown specimens of Berlin castings in iron, which, by their delicacy and beauty of outline, attracted considerable attention. Some specimens of the same kind of work may also be seen in the Edinburgh Industrial Museum. The minutest details are sharply defined, and the entire surface has a bronze-like smoothness. It has been generally believed that this kind of work was made by mixing with the iron some metalloid, which has the effect of giving to the metal more fluidity and density; but this, we believe, is not the case. The specimens are made of iron alone, and are the result of the laborious researches and experiments of M. Schott, the manager of Count Stolbergs' works in Brunswick. "His attention," it is stated, "was first directed to the importance of procuring the finest quality of molding sand, and to prevent, as far as possible, the accumulation of air in the mold which is drawn in during the process of pouring the liquid metal". His sand is made by mixing burned clay with pulverized sandstone, having a maximum porosity. It has also the fineness of grain which is essential in producing a delicate mold. An incident is related which illustrates the importance of this in this branch of the art. M. Schott, in explaining the subject to some friends who were dining with him, sent a folded napkin from the table to the foundery, and shortly after showed them a casting which which correctly represented the indentations produced by the finely woven thread of the fabric. The most important part of the process, however, is the preparation of the metal. M. Schott made a series of experiments to determine the melting point of different kinds of pig iron; and, by mixing several in proper proportions, he has been enabled to vary the melting point at will. It will surprise even practical ironfounders to learn that his experiments proved that the melting point of different samples of charcoal iron, made at his own blast furnaces, varied more than 800° Fah. Charcoal iron generally melts at 700° higher temperature than coke iron. The contraction, on cooling, is greatest in the charcoal iron, and, in most cases, it has the greatest density when solid. In examining various specimens of casting, M. Schott brought to his aid the microscope, and was thus enabled to detect certain differences which chemical analysis had failed to explain. The iron ore used by him is not different from that found in many other places. It is reduced in a series of small charcoal furnaces in the vicinity of the mines, which are situated in Northern Germany, near the town of Brunswick.

Modern Naval Warfare.

MR. A. L. HOLLEY of Harrisburg, Pa., who is thoroughly acquainted with the subject, has published in *Engineering* a lengthy article in which he claims for the Messrs. Stevens of Hoboken, that they were the originators of many, if not most of the improvements in modern naval warfare. He sums up their claims that the Messrs. Stevens, father and son, either originated, or first developed, the following important features of modern naval warfare. Twin screw, 1805; armor plating, 1812; inclined armor, 1812 and 1841; training guns by rotating the vessel, 1812 and 1862; engines and screws below water in war vessels, 1841; large engines to work expansively at ordinary times, and with maximum power in action, 1841; concentrated fuel (working to petroleum ?), 1841; iron hulls for war vessels, 1841; wrought-iron rifled gun, 1841; the Armstrong lead-coated elongated shot, 1841; concentrated protection, a central battery, a belt of armor at the water line, and a shell proof deck, 1843 to 1854; protecting the hull by immersion to fighting draft, by means of water let into compartments for the purpose, 1843 to 1854; wrought iron engine framing, and a wrought-iron ship of 420 feet length, 1843 to 1854; loading a gun below deck by steam power, 1862.

As to the later inventions of Mr. Stevens, we can testify to the correctness of Mr. Holley's assertion, his plans having been repeatedly presented to this office by the venerable surviving inventor.

TRADES UNIONS ON TRIAL.—The case of Mr. Henry B. Dawson, against the Bricklayer's Union in Westchester county, N. Y., for conspiracy in preventing his son from obtaining employment, has so far resulted in a finding of a bill by the grand jury, the defendants having carried the case up to a higher court. The decision will be looked forward to with interest.

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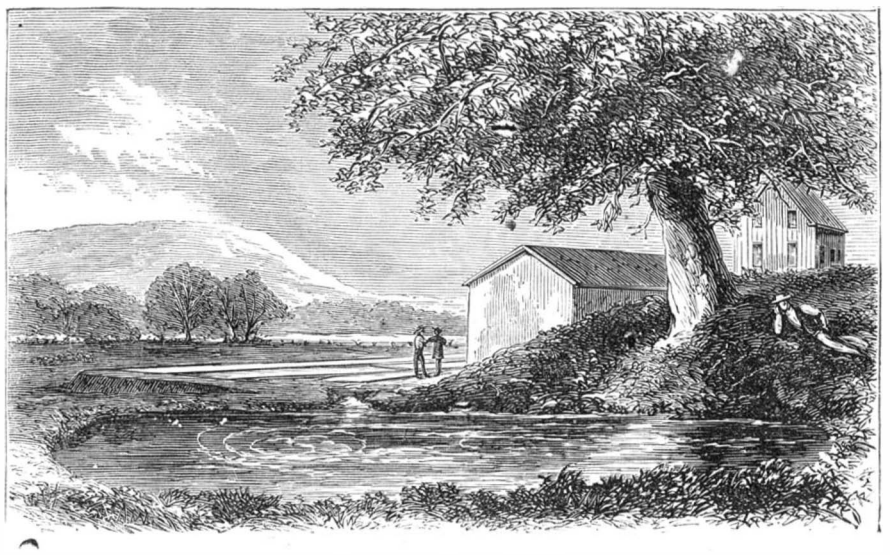
A NEW JERSEY FISH FARM.

The application of science to the artificial propagation and cultivation of fishes has long been recognized as an art. Although it is of no recent date, having been practiced by Jacobi at Hanover over a century since, it has but recently received the attention which it deserves. The rediscovery of the process of artificial impregnation of ova by the Vosgean fishermen, Gekin and Remy, and the founding of the great National French Fish Farm at Huningue, on the Rhine, have resulted in the foundation in Europe of a vast number of fish-breeding establishments; but in this country the subject is only beginning to receive the attention and legislation which it demands. We present herewith a series of illustrations representing a general view (with some details of the hatching process as there practiced) of the fish farm of Dr. J. H. Slack, at Troutdale, near Bloomsbury, N. J., sixty-four miles southwest of New York city, as described in *Harper's Weekly* of June 13th. The farm, comprising about sixty-eight acres, is in a high state of cultivation, as is the whole of the Muskanetkony Valley, in which it is situated; and well kept fences and neat buildings, those never failing signs of industry, bearing witness to the prosperity of the residents.



THE TROUTDALE SPRING.

THE SPRING.

The artificially-constructed ponds and buildings connected with fish raising, covering in all about two acres, are situated on the right bank of the Muskanetkony Creek, which here forms the boundary between the counties of Warren and Hunterdon; the former being upon the right, the latter upon the left of the stream These ponds are supplied with a pure crystal water from a large and beautiful spring, from which it flows in a continual stream at the rate of 1,000 gallons per minute. This water is, in summer and winter, of the same temperature, 50° Fah., and reaches the hatching house and ponds at the same temperature. This is a matter of the greatest importance in fish hatching. In the spring there are about two hundred small trout, naturally bred. From the spring the water is led by a race-way to and circulated through the three ponds and hatching houses At various points gates or sluices are located, furnished with wire screens, which serve the double purpose of preventing the escape of the fishes and of collecting leaves, sticks, or other articles which may accidentally find their way into the ponds. These screens are cleaned twice a day, except during the autumn, when the falling of the leaves from the trees which overshadow the spring necessitates more constant care.

THE PONDS.

The ponds at present contain about seven hundred adult trout, with a few hatched during the winter of 1866–7 by Mr. Thaddeus Norris, the well-known angler and former proprietor of the ponds. Some of the fishes are marked by striking peculiarities, and have received distinguishing names. One is known as "Bartimeus," from the fact that he is totally blind, and perfectly black in color; "Lady Douglas" has one side of her head of the same somber hue. A long, lean, lantern-jawed male is appropriately yclept "Don Quixote," while a huge three-pounder, who fought it out on the line during the entire spawning season, killing and devouring over a dozen large fishes, is called "General Grant." There was formerly in the large pond a curious parti-colored fish, with irregular spots and streaks of white and black, the colors varying almost weekly, which was known to some of the numerous Democrats in the vicinity as "Horace Greeley;" but he is now no more, having been unfortunately killed and eaten by "General Grant" in December last. The trout is a sad cannibal; "the dog," it is said, "will not eat dog;" but a trout of but one and a half inches will unhesitatingly seize and devour one of his own species two thirds his own length. Various fishes over a foot long have disappeared from time to time down the capacious throat of "General Grant." On this account three ponds are necessary. The one nearest the hatching house is now being prepared for the reception of the twenty thousand young trout hatched at Troutdale during the past winter: the middle one is devoted to trout of eight inches and under, while in the third are placed the larger fishes, many of them of a size calculated to cause a lover of "the gentle craft" to infringe upon the Tenth Commandment. The bottoms of the ponds are of clay, upon which have been placed a number of large stones, in order that the trout, by rubbing against them, may free their bodies from the numerous parasites, animal and vegetable, which frequently infest them. Shade is afforded by large floats, secured to the banks by wires. The races are slated, to prevent the crumbling of the banks, their bottoms being covered with small stones, upon which is placed a layer of fine gravel, though the latter is not plentiful in the vicinity.

THE HATCHING HOUSE

is situated upon the right bank of the first pond, and a neat lodge to the westward is occupied as a residence by the assistants.

FEEDING.

The large trout are fed with curd, the offal from slaughter houses cut in fine pieces, and fishes, the latter sometimes living. During our visit two living red-fins about 4 inches in length (*Leuciscus cornutus*) were thrown into the pond; they were immediately seized by two huge trout, who at once retired to the lower end of the pond, there to swallow and digest them at their leisure. The gullets of the captors being shorter than their prey, over an hour elapsed before the tails of the red-fins vanished down the throats of the trout.

DR. SLACK'S EXPERIENCE.

Dr. Slack is a thorough lover of the art and craft, and as he is also a thoroughly educated naturalist, his experience and experiments in the artificial hatching of trout ova has a double value and increased interest, and we append it hereto, partly in explanation of some of our illustrations of the process of taking and hatching the eggs:—

"About the middle of the month of October, 1857, it became evident that the spawning season was at hand. The colors of the adult fishes began to alter to an extent noticeable by the most unpracticed eye. Losing the bright tints with which they were formerly bedecked, the female trout became dark and somber in color, putting on a grave and

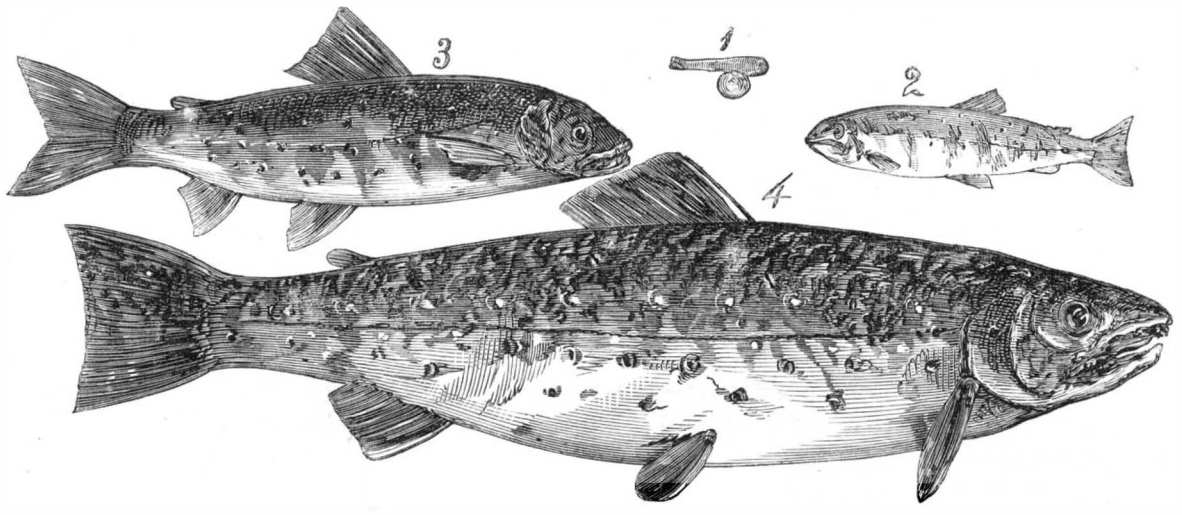
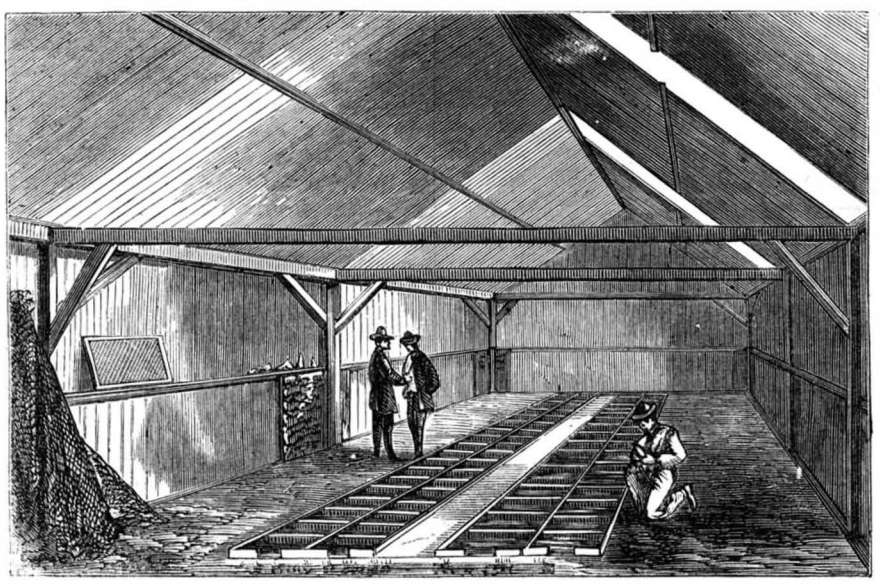


Fig. 1, One week old. Fig. 2, Three months old. Fig. 3, Six months old. Fig. 4, One year old.

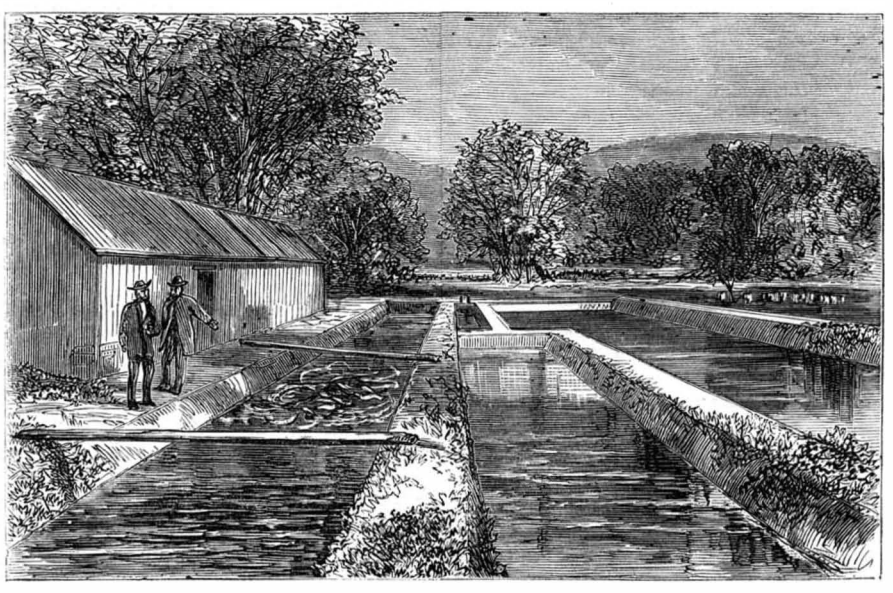
THE TROUT AT VARIOUS AGES.

SECURING THE TROUT SPAWN.

FEEDING THE YOUNG TROUT.



THE TROUTDALE HATCHING HOUSE.



THE TROUTDALE FISH PONDS.

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matronly dress. The hues of the males were, on the contrary, more brilliant than previously. Their general color became much lighter, and in the older individuals the lower jaw projected anteriorly, forming a sort of knob. The distension of the abdomen of the female by the eggs, caused the section of her body to assume an oval shape, while that of the male resembled the outline of the eye of a broad-axe. Fierce battles took place between the males the conqueror celebrating his victory by feasting upon the body of the vanquished; the females swam uneasily about the ponds, trying the bottom with their fins, seeking for gravel in which to deposit their eggs. The bottoms of the ponds being formed of clay and large stones, they were obliged to pass into the races for that purpose. These had previously been prepared by covering their bottoms with fine gravel, and placing across them obstructions, forming a series of dams and eddies.

"On October 30th, fishes were perceived in the race, busily engaged in forming a nest for the reception of their eggs, by removing the fine gravel from a circle of about a foot in diameter. Across the lower end of the raceway, a net was quietly placed, and the gate at the racehead closed, by which the flow of water was stopped. To avoid being left high and dry, the fishes were obliged to pass down stream, and were thus captured in the net, the fishes being placed for the nonce in a large tin kettle. About a quart of pure spring water was placed in the impregnating pan; a male was then taken and held in the manner depicted in the engraving, the left hand grasping the neck below the gills, and the right the body just behind the gills. By gentle pressure with the fore and middle fingers of the left hand, a quantity of the milt was expressed, the amount being further increased by gentle friction toward the tail. This was continued until the water became opalescent or pearly in its appearance. A female was then taken and treated in the same manner, eggs, instead of milt, being extruded. The eggs and milt were allowed to remain in contact for about fifteen minutes, at the expiration of which time they were carefully washed.

"It has been ascertained by experiment, that fifteen grains of the milty fluid of the male is sufficient to impregnate ten thousand eggs; but in practice a much greater quantity is used. The bottom of the impregnated pan, as shown in the same drawing, having a depression calculated to hold one thousand eggs, the quantity obtained could be readily estimated. The eggs average one sixth of an inch in diameter, and weigh one grain each.

"After being thus secured, the eggs were taken to the hatching house, which had been made ready for their reception in the following manner: The hatching-trough had been filled to the depth of two inches with fine gravel carefully boiled, to destroy the eggs of any insects which might have been present; over this a gentle stream of water from the spring, filtered through four screens of fine flannel, was conducted. Upon the gravel the eggs were placed, the greatest care being taken to avoid any sudden jar, as the recently impregnated egg requires the most gentle handling, lest its suddenly acquired life be as suddenly extinguished. After resting in their new location for a few moments, they were evenly spread over the bottoms of the troughs by means of a fine feather. During the entire process the eggs had not for an instant been exposed to the atmosphere

"This process of impregnating and depositing in the hatching house was repeated semi-daily until January 12, 1868, during which period about seventy-five thousand eggs were taken. Experience shows that from a trout of one pound about one thousand eggs is the average yield; but owing to causes entirely beyond the control of the proprietor, only twenty thousand hatched. The dead eggs were removed daily, being readily distinguished by turning snow white; those still retaining their vitality resembled small pearls, being translucent and slightly clouded. The first young appeared December 10th, forty days after the impregnation of the eggs.

"When first hatched, the young presented the grotesque appearance shown in the smaller figure of the cut of the trout. The ungainly abdominal appendage, technically termed the 'yolk sack,' is, however, gradually adsorbed into the body of the young fish, the entire process requiring six weeks for its completion.

"During this period the young trout requires no food, being nourished entirely by the contents of the 'yolk sack;' but immediately after its absorption it is necessary that they should be regularly and carefully fed. Various substances, all of an animal nature, have been tried, but after various experiments, Dr. Slack has found the muscular fiber composing the hearts of beef cattle to be the most suitable. This is prepared by being chopped into minute fragments, which are passed through a fine wire sieve. When the fishes have attained the length of one and a half inches, the eggs of other fish are employed as food. When placed in the first pond, they will be fed entirely, for some time, upon maggots, the larvæ of the common blue-bottle fly. The appearance of these disgusting, though to the pisciculturalist useful little animals, are regarded as fixing the period at which the transfer from the hatching house to the pond should take place."

Troutdale, as we have stated, is easy of access from the city of New York, and a visit to the ponds would amply repay any one interested in the art or science of pisciculture.

It is a part of the business of the fish farmers to furnish in season impregnated trout eggs, either for the stocking of ponds or of scientific observation and research. They can be carefully packed, and forwarded by express to any point, with full directions, or under the care of a competent person. By means of a small apparatus invented by Dr. Slack, which can be placed in an office or library, the fishes can be hatched without the necessity for a hatching house. This apparatus is not unlike the aquarium in common use in our parlors, and requires very little more attention, though the work of "manufacturing trout" at home would furnish far more interesting employment than a mere aquarium, and at the same time be not less pleasant to look upon'.'

The *Evening Post* says, on the subject of fish culture, that, "In nearly all our rivers the supply of fish is growing less. The stake nets in the Hudson, stretching for hundreds of rods into the channel do not take more in a day than were formerly taken in nets a quarter or a fifth of their size. In the Susquehanna, Potomac, James, and Deleware, where drift nets are used, the supply of fish is in like manner decreasing. No more fish can now be taken in a net a hundred rods long than formerly in one of five rods. The same reports come from the South; and, unless the fisheries are suspended, or the supply of fish increased by artificial means, there will soon be no more shad in the market.

"The commissioners recently appointed by the Albany legislature. Messrs. Seth Green and Robert B. Roosevelt, have entered upon their duties—the establishment of suitable hatching boxes along the upper waters of our rivers—with much interest and in a manner that promises the most gratifying results. Although appointed for New York only, they have lately visited several southern states, to endeavor to interest the fisherman of the southern rivers in pisciculture, and to induce them to adopt the system of artificial breeding that has proved so successful in Connecticut. Their object in thus extending their observations and labors is to make fish culture general. It has been discovered that shad do not invariably return to the rivers in which they are spawned, and in order that an even supply may be obtained it is necessary that the propagation should proceed simultaneously on all parts of the coast. The James river was the furthest point south visited by the commissioners. There they succeeded in interesting the fisherman and establishing hatching boxes on a small scale. On the Potomac it is expected that their suggestions will be generally adopted.

"The Susquehanna and Deleware are to be visited, if they have not been already, and after introducing the system extensively in our rivers, the commissioners will proceed east in July or August. By this means it is expected that the next year's supply of shad will be largely increased, while that of the following season will be still greater."

HERRING'S CENTER VENT WATER WHEEL.

Perhaps one of the main faults of turbines in general use is the expenditure of a considerable amount of the force of the water against an immovable platform, tending to retard the course of the stream; and another is the diversion of the

Fig. 1

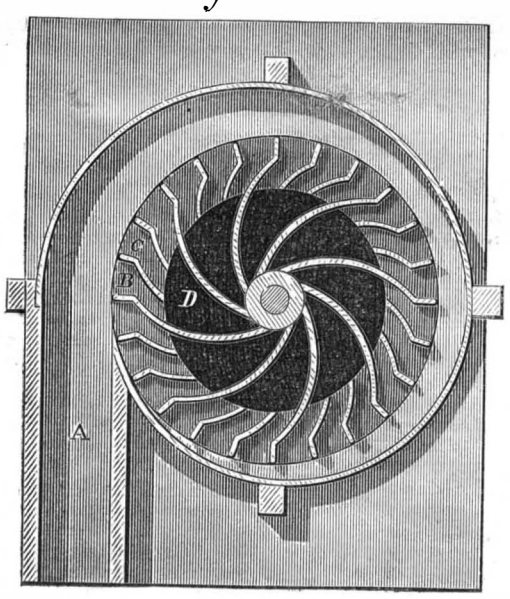
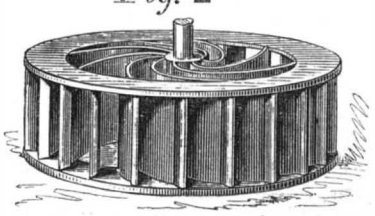


Fig. 2



current toward the center, where comparatively little force can be exerted, and the want of an exit of sufficient capacity to release the water after it has done its work, or expended its force. The intention of the inventor of the form of wheel shown in the accompanying engravings is to obviate these objections and utilize in a more perfect manner the force of the water.

Fig. 1 is a plan view, as seen from its top, showing the scroll, A, the alternate long and short buckets, B and C, and the center vent, D. Fig. 2 is a perspective view of the wheel, showing the long buckets, extending from the periphery of the wheel to the center, and the short buckets, reaching from the periphery to the inner edge of the lower rim. The buckets, both long and short, are radial at their outer ends, where the water impinges upon them. The bottom of the scroll, A, has a circular opening that receives the lower rim of the wheel, and the water acts first against the radial parts of the buckets, and then re-acts against the curved portions, passing out through the opening at the center of the lower rim, which forms a portion of the bottom to sustain the water.

The wheel may be set to turn either to the right or left, as occasion may require, operating equally well in either direction. The advantage of alternate long and short buckets is, that the water has a strong action against them near the periphery, while a free escape is allowed for the water after its force is expended.

The device was patented Oct. 29, 1867, by George W. Herring, and all communications relating thereto should be addressed to him, Joseph Taney, or Thomas N. Egery, all of Bangor, Me.

FELL'S RAILWAY OVER MONT CENIS.

In our editorial letter published on page 259 of the last volume, we referred to the near completion of Fell's over-mountain railway. Since that time the cars have been put on, and from last accounts regular trips were being made. Some of the worst bits of the line, the steepest gradients, the sharpest curves, the most appalling glimpses down precipices and into rugged ravines, where the train, if overthrown into them, would most assuredly be smashed to splinters, occur within the first few miles after leaving Susa. But the newcomer on the line contemplates these without emotion. No unpleasant sensation of peril distracts his attention from the engineering skill and resource displayed in the construction of the line, or prevents his enjoying the beauties of the mountain scenery. He feels like one drawn along a difficult road, but from whose mind every timorous sensation is banished, by seeing how completely the skillful driver has his steam horses in hand, directs them at will, curbs them with a finger. And, indeed, it is this curb power which constitutes one of the greatest marvels of the Fell system. When going twelve miles an hour down gradients of one in twelve, the brakes are applied, the perpendicular wheels cease to turn, the horizontal wheels clip the central rail with hundred-vise power, and within some thirty yards the train is brought to a complete standstill, without the slightest shock or concussion. It would be possible to employ such power as would bring the train up short, and produce all the effects of a railway accident. When one stands upon the line and contemplates the steepness of the slope down which one has just slid easily without strain or inconvenience, he to some extent realizes the prodigious force applied to restrain the momentum of the string of ponderous carriages launched upon that declivity. It is the triumph of mechanical power wielded by a few brakemen's hands, that turn, without apparent effort, the bars in connection with the various wheels. The control is perfect, and measurable to a nicety. In fact, on the descent of the mountain there is nothing to warn a traveler, who should not look of a window, that he is on a railway of a very unusual construction. The motion is steady and easy; there is no jarring of any kind, and one soon ceases to notice the sloping position of the train.

Not less surprising than the steepness of the ascents and descents, is the abruptness of many of the curves, some of them forty-four yards radius. It is probably by these that nervous persons will be more unpleasantly impressed than by the up-and-down-hill work, until a little practice removes the unfounded apprehension. As before mentioned, some of the worst bits of the road are in the first four miles after leaving Susa. Some of the curves are so sharp that one can hardly understand how the carriages, which are about fourteen feet long, outside measurement, contrive to grind round them. But round they do go, with perfect ease, just when one might fancy they were about to fly off, like a steel bar escaping from a curved groove, and, as they turn, the wheels and rails together give out a shrill metallic sound, which one at first may mistake for a whisper of the railway whistle. Just below the now abandoned but still formidable looking fortress of Esseillon, which all who have passed the Cenis will remember, frowning toward France a little below Lanslebourg, is one of the most remarkable of these curves, horseshoe shaped and forming three fourths of a circle. The places where the line runs very close to the edge of deep precipices are few in number. What has been said already of the power which the engine driver and brakeman have at their command by means of the horizontal wheels, will have convinced all that, with common care, there exists no danger, no possibility of the train getting off the rails. This conviction is soon arrived at by any person traveling on the line, and who, however small his scientific knowledge, takes the trouble to examine the principle and construction of the railway and carriages. Another danger, more than once suggested as scarcely to be avoided, disappears upon actual observation. I refer to the risk of a crumbling of the edge of the mountain road. Aided a little by imagination, this looks very plausible upon paper. For the greater part of the distance, but not throughout, the railway gives the wall to the horse and pedestrian traffic, and takes the outside edge. This does not mean, however, that it is constantly on the brink of precipices; and, where it is so, every precaution has been taken. The masonry that already existed as a support to the coach road, has been examined, strengthened, and extended. Large masses of fresh wall, often many feet thick, have been constructed in various places. It is so obviously the interest as well as the duty of the company to make assurance doubly sure in this respect, that it is absurd to suppose every precaution has not been resorted to.

Danger from avalanches has been guarded against by covered ways, some in masonry—where stones and pieces of rocks are apt to fall—and others of iron roofing. The adoption of this plan has enabled the constructors of the line to make use of a considerable part of the old road over the mountain, a gradual ascent which was abandoned for a zigzag line, on account of the danger to passengers from avalanches and falling stones. Exclusive of several short tunnels, the road is covered in for a distance of altogether nearly six miles, in several places on each side of the summit of the mountain. The chimneys of the experimental engines were considerably lower than those of the French engines employed for the

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traffic, and the consequence has been that the covered ways are too low to allow the smoke and steam to rise, and in some places the heat is stifling. In the last covered way on the Italian side of the summit, we were in a vapor bath. But this discomfort will have been completely avoided in a few days, as it already has been in some parts of the covered ways. Openings are being cut along the roofs, and no more inconvenience will then be felt than if the line were uncovered—far less than is habitually experienced in the long tunnels between Turin and Genoa, and Bologna and Florence. Before winter shall return means will have been employed to complete these covered ways in a manner that shall exclude the snow, and yet allow the smoke and vapor to rise. It is also intended to try various kinds of fuel, and if possible to adopt that which gives out the least smoke.

The time hitherto employed (in the various trial trips recently made) in getting across the mountain, has been a little over four hours of actual locomotion. But stoppages are inevitable, chiefly for the purpose of watering the engine, and the journey will hardly take less than five and a half hours, at least, under present arrangements, which would be equal to about ten miles per hour. The diligences, in ascending the mountains, make about ten miles in three hours.

Editorial Summary.

ICE MACHINERY —A correspondent writes us from New Orleans that a company in that city is now engaged in making blocks of ice of any convenient size. The two machines, made after the plan of Carrie, of Paris, are now in operation, and produce twenty-four tuns per day. Two other machines are nearly completed. By a certain evaporating process, of which ammonia is the chemical ingredient, and heat the active agent, the filtered water of the Mississippi is converted into cakes of ice eight or ten inches wide and two feet long by two inches thick, at a cost less than that of transportation from the North—less than $5 per ton. What will be the result of this new industry, time alone can determine. If it be what it seems, ice may be made cheaper, as it is wanted, in our Northern cities, that it can be cut in the winter and preserved for summer use.

TROPICAL TELEGRAPH LINES.—The putting up of telegraph lines in the jungles and forests of the tropics is a work of the utmost difficulty, and the peculiar conditions of the region require special methods of construction. In India the wires are really small bars of iron ⅛ of an inch in thickness, an amount of rigidity being thus obtained, which is necessary to meet the requirements of the country. The difficulty, which in this country, is experienced in keeping the wires insulated during heavy rains, fogs, or thunder storms, is immensely augmented in the regions where these meteorological phenomena abound, and the use of this large size of wire is rendered necessary to retain enough electricity to work the wires.

PARISIAN ELECTRICAL JEWELS.—M. Trouvé has made several new and ingenious applications of electro-magnetism in ornamental trinkets, so that now it is quite common to see at fashionable balls in Paris a diminutive butterfly or humming bird perched upon a lady's head, and fluttering its wings as naturally as possible. The owners of these toys carry concealed in their chignons a small battery and minute Ruhmkorff coil, the former composed of zinc excited by a solution of sulphate of mercury, the whole inclosed in vulcanite cells, so that the existing solution cannot escape to the damage of the owner.

A REMARKABLE MIRAGE was lately witnessed at Dover, England, whereby the dome of the Cathedral at Boulogne, France, was made distinctly visible to the naked eye, and by means of a telescope, the entrance to the port, its lighthouse, shipping, the hills surrounding the town, and neighboring farm houses, with their windows illuminated with the setting sun, were plainly distinguished. Even a locomotive and train were seen leaving the city and traveling toward Calais. The distance from Dover to Boulogne is about thirty miles.

ARCHÆOLOGICAL RESEARCHES IN THE WEST.—The vestiges of the works of the ancient "mound builders" of the West, are being made a study by the eminent archæologist, Dr. W. De Hass. He has made a general survey of the field, locating the ancient works, mapping and measuring them, collecting information and vestiges of art, and excavating many of the smaller tumuli. When finished, an account of his explorations will be published in a superbly illustrated volume.

CRAB CULTURE.—A gentleman at Annapolis. Md., has fenced in a cove on the Severn river, for the purpose of raising crabs for market. He has now about 4,000 of these crustaceans in advance, and feeds them on coarse fish and any kind of refuse meat. A daily inspection is made of the stock, that those who have shed their shells may be dispatched to market in this state, when their value is twenty per cent higher than when possessed of their ordinary covering.

A FRESH and very complete specimen of ancient mosaic art has just been unearthed in Rome, being the pavement of a room excavated in the Vicolo Sterrato. Other rooms belonging to the same house will be revealed by excavating in the adjoining garden, belonging to the nuns of Santa Susanna. The peculiar interest attached to this discovery is the almost assured fact that the building containing this mosaic formed part of Sallust's villa.

A CORRESPONDENT in South Carolina writes that the peach trees give promise of affording the most abundant crop ever known. As the internal revenue tax is too enormous to allow the profitable manufacture of peach brandy, the only way to save them is by canning and shipping north, and such will be the supply that our informant apprehends prices will be lower in the New York market next fall and winter than ever before.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The bill passed a few days ago by the Massachusetts House of Representatives, authorizes the Governor to make a contract for finishing the Hoosac tunnel within seven years, at an expense of not more than $5,000,000. It also provides for the payment of $250,000 for the completion of the Troy and Greenfield railroad, and $350,000 for interest.

The vast coal mining operations in the famous "Black Country," of England, are beginning to produce effects long since apprehended by mining engineers. The local papers state that recently, at Cinder Hill, the ground began to subside, and continued caving in for several hours, resulting in a pit 172 feet wide and about sixty feet deep. Trees, hedges, and a great quantity of brick clay were swallowed up, but no loss of life is reported.

In the manufacture of trimmings, made to a great extent of silk waste, there are employed in Paris alone 8,500 persons, producing annually products to the value of $8,000,000, and throughout the empire this industry occupies more than 30,000 hands whose aggregate production is valued at $20,000,000.

The leading directors of the Hudson river and Central railroads, lately passed over the line between New York and Buffalo, on a tour of inspection. With a single engine, the train traveled over the former road at the speed of sixty miles in seventy minutes. On their return, the distance of thirty-six miles, from Rochester to Lyons, was run in the space of forty minutes.

The people of Montana are devoting some attention to coal mining, an extensive deposit having been opened near Virginia City. The supply appears to be practically inexhaustible, and though of inferior quality, there is little doubt but that it will improve as a greater depth is attained, as is usually the case in coal formations.

An enterprising English company, after overcoming almost insurmountable difficulties, have established two extensive iron works at Zimapan, in Mexico. In these works steady employment is given to between 500 and 600 native laborers, and over 600 tuns of iron are annually manufactured into bars or other varieties of merchantable iron, and sent to the city of Mexico over a difficult mountain road, built and kept in condition by this same company, at their own expense, the government never contributing in labor or money to its construction.

A portion of the Philadelphia, Wilmington, and Baltimore railroad is now being relaid with steel rails, made at Lancaster, Pa., from metal made by mixing the ores of that locality with magnetic iron ore from New York. The metal is said to wear very slowly, is not liable to mash, and is of great strength.

The average cost per mile of the railways of Pennsylvania, is $45,186 91; of Illinois, $37,583 13; of Nebraska, $19,334 88; of Missouri, $30,167 73; of Texas $62,002 15. The first cost of constructing English railways is immense, when compared with these prices, but when once built the British road requires far less working expenditure. To keep the line in repair in England costs less than eleven cents per mile annually; for French roads, eight cents, and for American roads at least twenty-five cents per mile.

Mr. Philips, in his communication to the Royal Society of London, describes the growth of mineral veins in a locality about seven miles distant from the Comstock silver mines, Nevada. The region abounds in boiling springs, and from them sulphur, silica, and an anhydrous oxide of iron are deposited, the two last forming semi-crystalline beds. One fissure exhibits a silico-metalliferous deposit. Mr. Philips concludes that quartz veins have generally been produced by slow depositions from aqueous solutions of silica. That gold may be deposited from the same solutions he attempts to prove from the presence of that metal in pyrites enclosed in siliceous incrustations, and from the fact that large quantities of the precious metal have been found in the interior of the stems of trees, which, in deep diggings, are often converted into iron pyrites. Sulphide of iron may in some way be connected with the solvent by which metallic gold is held in solution.

At Munich, Germany, is a governmental iron foundry, or industrial school, where the best iron workers in Germany have received their education. But this establishment, whose products have obtained a world-wide celebrity, is about being broken up, the people's parliament having requested its discontinuance, because carried on with an annual loss of $700. During its existence, besides several thousand small figures, busts, and ornaments, the foundry has turned out one hundred and forty nine colossal statues, six equestrian statues, eight ornamental gates, an obelisk one hundred feet high, and the statue of Bavaria, sixty feet in hight; and at the present time a number of large works for this and other countries are under way, including a fountain with sixteen figures for the city of Cincinnati, another with five figures for Central Park, New York, a statue for St. Louis, and six life-size figures for the Washington monument, Richmond, Va.

The contest in the Connecticut Legislature, which has waged for several years past, between the friends and opponents of a railroad bridge across the principal river of the State, has been decided in favor of the former interest. To the Shore Line railroad company is granted the desired permission to construct a draw bridge over the Connecticut, at its mouth, and to the projected Air Line road between this city and Boston, another bridge over the same stream, at Middletown.

The cities of Lowell and Fall River are having a friendly dispute concerning the right, claimed by each, to the title of the "Spindle City." Lowell boasts of 483,864 spindles, 12,518 looms; Fall River of 507,900 spindles, 11,500 looms; the first giving employment to 13,729, the last to 6,750 hands. It is not really the simple number of spindles that gives the glory, for one mill may turn out more goods than another with a larger number of spindles. The Lowell mills, last year, used 16,770 tuns of cotton while those of her rival manufactured 11,637 tuns. Additional to this, each city has peculiar products, whose values are not comparable, so that no final decision of the case can be fairly made.

Mr. J. F. Bennett announces that he can remove sulphur and phosphorous from pig iron, during its treatment in the Bessemer process, by introducing into the converting vessel carbonic acid gas, either before or with the air blast. He asserts that sulphurous and phosphoric acid are formed at the expense of the carbonic acid gas, the carbon of which is liberated. The gas is produced by acting on brimstone by hydrochloric acid, or by burning carbonaceous matter and storing in a gasometer.

A magnetic mountain has been discovered in Swedish Lapland. It is traversed by a vein of magnetic iron, several feet in thickness. The owner hopes to supply all the world with loadstones. One weighing sixty-eight Swedish pounds has come into the possession of Prof. Dore, of Berlin.

An agricultural exchange presents the claims of the railroad to the farming community by showing that, on a common road, wheat would consume its own value if carried three hundred and fifty miles. In other words, it would be worthless at that distance from market, while by rail it can be carried three thousand miles at a profit. Railways, then, multiply by ten the distance from any grain market at which its wheat may be raised, and the same remarks apply with evident variations to other products.

New interest is awakened in the proposal to bridge the English Channel, from the fact that a design by M. Bouet, a French engineer, has received the favorable commendation of his Emperor, who has ordered him to elaborate all details of the plan, compute the cost, ascertain the time necessary for its construction, and probable profits of the enterprise. The bridge is composed of a series of ten lengths, each with a span of two miles.

In Mr. Hewitt's report on the European Rolling Mills, it is stated that reversing mills are generally employed in Great Britain in preference to three-high rolls. In France, three-high trains have been in use for rolling girders since the year 1849, and everywhere upon the Continent the principle seems to be perfectly well understood, but the reversing mill is generally preferred.

On a line of railroad owned by the Lehigh coal and navigation company, is a plane at the north slope of the Wilkesbarre mountain, with an inclination of 14 feet, 8 inches per 100 feet. For dragging the loaded cars up the slope, a wire rope, said to be the largest, heaviest, and longest ever made, has just been completed at an establishment in Trenton, N. J. The load drawn up at each trip is eighty-five tuns; length of rope, 3,700 feet; diameter, over two and one half inches, and weight twenty tuns.

How best to furnish communication between passengers and guards, is a problem as yet unsolved in the British mind. The latest plan for accomplishing the desired aim, is providing each train with a long metallic tube, closed at its hinder end, and connected at its other end with an air pump, placed under the tender of the engine. The piston of the pump is connected with the driving wheels, so as to work slowly as long as the train is in motion. As long as any air is in the tube it is exhausted by the pump, and forced out through a whistle near the engineer. The tube has a tap in every compartment to be opened in case of necessity, when air is admited, the whistle, as a consequence, sounds, and as the passenger cannot close the orifice, will continue so doing until the train is stopped.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

ANTI-GRANULATING LARD COOLER.—Geo. C. Cassard, Baltimore, Md.—The object of this invention is to enable lard to be rapidly cooled in large quantities, by machinery, in such a manner that it shall not granulate, and thereby become injured in quality.

GAS STOVE.—J. D. Spang, Dayton, Ohio.—The object of this invention is to construct a neat and convenient portable self gas generating stove, which can be easily kept in order, and regulated, which is adapted to all the various purposes of cooking, heating, etc., and which utilizes the heat and the fuel to the greatest possible degree.

INK WELL FOR SCHOOL DESKS.—C. T. Chase, Albany, N. Y.—This invention consists of an improved ink well, the arrangement of which is such, that but a small opening is left for the ordinary purpose of dipping, over which a cap fits when not in use; but, also, so constructed that the whole cover is readily moved aside, when desired, for the purposes of filling or cleansing the well.

ARTIFICIAL FUEL.—E. Louiseau and C.F. Reguin, Nashville, Tenn.—This invention relates to a new compound of which coal dust forms a material ingredient. The object of the invention is to utilize coal dust, by mixing it with cheap substances, so as to enable the poor to acquire a good, inexpensive and convenient fuel.

LAMP BURNER.—J. W. Schreiber, New York city.—This invention relates to a new lamp burner, which is not dangerous and by which a large, bright flame is produced.

MUSIC TYPE.—Edward L. Balch, Boston, Mass.—This invention relates to a type for printing music charts for use in schools, seminaries, etc., the object being to print such charts with ligneous type, as with movable metallic types, and as the distance at which the charts are required to be seen and read is great, thick and heavy lines for the music staff, as well as the stems of the notes, are required.

CULTIVATOR.—Samuel Reed, Rising Sun, Md.—This invention has for its object to improve the construction of cultivators, so as to make them more convenient and effective in operation.

WARPING CHUCK.—Joseph T. Haskins, Rockport, Mass.—This invention has for its object to improve the construction of the common warping chuck, so as to prevent the wearing or chafing of the warp or lines in warping a vessel, or when she is fastened to the wharf.

CROSS BAR LOCK.—James E. Hanger, Staunton Va.—This invention has for its object to furnish an improved cross bar lock, simple in construction, easily operated, and effective in operation.

MACHINE FOR MAKING BEER CASK BUNGS.—W. Donaldson, Cincinnati, Ohio.—This invention has for its object to furnish an improved machine by means of which beer cask bungs may be formed rapidly and accurately.

SUBTERRANEAN WALLS.—Max Thode, Mattoon, Ill.—This invention consists in forming the walls of cisterns, cellars, or other subterraneous structures, in two parts, or double, with an interlining of pitch, asphaltum, or other equivalent resinous substance, by which means water or dampness is excluded.

AUGER.—N. C. Sanford, Meriden, Conn.—This invention consists in forming an auger with two or more cutting lips communicating from the first or usual cutting lip and passing around the last turn or twist of the helical part of the auger, each successive lip being at at a quarter distance from the axial center of the auger than the preceding, and in a different horizontal plane, whereby the paths of the several lips are different and distinct, and the auger may be operated more easily.

CIRCULAR FILE AND SAW SET.—Benj. F. Pendexter, Minot, Me.—This invention relates to a new and improved method of constructing machinery for the filing of saws and plain surfaces and for setting of saws, whereby the same is done more accurately and more rapidly. It consists of a circular file attached to a flange wheel on a rotary arbor, and of an adjustable table attached to the frame on which the saw or other article to be filed is placed, so that the same may be set at any angle to the rotary saw. It consists also of an automatic saw set attached to the frame of the machine and in combination therewith, operated by a cam in said arbor against the face of a spring or its equivalent, whereby the saw may be set without the operator leaving the machine.

HAT AND WEB FELTING MACHINES.—Chas. Mossant, Bourg du Péage France.—This invention refers to a new method of constructing a felting machine, which is applicable to and particularly designed for the felting of hat forms or cones, but which can be effectively applied to the felting of wool in one continuous web or band, or similar articles.

ASH SIFTER.—Charles Folsom, New York city.—This invention relates to a new and useful device by which ashes or other substances may be both transferred to the sifting apparatus, and sifted without the escape of dust.

WAGON OR SLED BOLSTER.—George Richards, Richland Center, Wis.—This invention relates to improvements in bolsters for wagons, sleds, etc., the object of which is to provide a connection for the stakes, whereby they may be turned down out of the way when the wagon or sled is to loaded with any heavy article requiring to be passed over the side of the same.

MACHINE FOR MAKING CIGARS AND CIGARETTES.—Joseph and Alexander Marengo, Burlington, Vt.—This invention relates to a new and useful machine for the manufacture of cigars and cigarettes, whereby much valuable time is saved and a quality or kind of tobacco may be used which by other methods cannot be worked into cigars.

LATHE MACHINE FOR FITTING WRISTPINS IN CRANKS.—Geo. Raft, Erie, Pa.—The object of this invention is to accomplish the fitting of wrist pins in cranks or crank disks, whereby the axis of the wrist pin shall be exactly parallel with the axis of the crank shaft, a condition always requisite to obtain a smoothly working crank shaft. It consists of a boring attachment which is borne by the lathe carriage, to bore out the eye for the wrist pin while the crank shaft is still on the centers of the lathe.

CAR WHEELS.—W. R. Thomas, Catasauqua, Pa.—This invention relates to improvements in car wheels made of cast metal, whereby it is designed to provide a more durable wheel, and one which is less liable to be effected by unequal contraction or expansion than any now in use, and it consists in an improved form of wheel, where by the metal is disposed in a manner better calculated to secure the aforesaid objects.

IMPROVEMENT IN ROLLERS FOR FORMING AND FINISHING CAR AND WAGON AXLES.—W. S. Mackintosh, Pittsburgh, Pa.—This invention relates to a new and improved method of constructing rollers for forming and finishing the axles of cars or wagons, whereby the same are more economically and perfectly formed and finished.

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CORN MARKER.—W. E. Phelps, Elmwood, Ill.—This invention relates to a new and improved device for furrowing or laying off ground in rows to receive seed corn. The invention consists in the application of three wheels to a frame constructed in a usual way, whereby, as the machine is drawn along, three furrows will be made, and the wheels allowed to conform perfectly to the inequalities of surface over which it may pass.

REEL FOR REAPING AND MOWING MACHINES.—Wm. F. Rundell, Genoa, N. Y.—This invention relates to an improvement in a reel for reaping and mowing machines, for which reel letters patent were granted to this inventor December 31, 1867.

SILL AND WEATHER STRIP FOR DOORS.—J. E. Linsley, Goshen, Ind.—This invention relates to a new and improved sill and weather strip, for which letters patent were granted to this inventor, bearing date June 19, 1866.

COMBINATION TOOL.—C. M. LOWE, Cincinnati, Ohio.—The present invention relates to a tool in which are combined, among others, a pair of calipers, dividers, and compasses, a surface gage, and a square.

COMBINED HARROW, DRILL, PLANTER, AND ROLLER.—D. B. Platt, Madison, Ind.—This invention has for its object to furnish an improved combined harrow, drill, planter, and roller, so constructed and arranged that the drill and roller, or planter, may be used together, or the roller and harrow may each be used alone, as may be desired, according to the particular work to be done.

SHOOTING GALLERIES.—James S. Conlin, New York city.—This invention has for its object to improve the construction of shooting galleries, so as to make them convenient for use, easily operated, and entirely safe.

MOLDING MACHINES.—E. H. Ripley, North Chelmsford, Mass.—This invention relates to a simple and effective machine for forming moldings, which is so constructed and arranged that by very simple adjustments the same cutter may be used for cutting moldings of many different designs, so that with an ordinary ogee cutter fifteen or more different designs of fancy moldings may be cut. The adjustments necessary for effecting these results are very simple and easily made. And the result is the production of a neat, compact, practicable, and useful machine, well calculated for use in the work shop.

WINDMILL.—J. Tobias Braun, Randolph Centre, Wis.—This invention relates to a new self-setting windmill, which is so arranged that the horizontal axle on which the wings or sails are mounted has bearings on both ends, thereby allowing the use of less clumsy apparatus, and doing away with much friction.

DAMPING APPARATUS FOR LITHOGRAPHIC MACHINES AND PRESSES.—Geo. Cooper, New York city.—This invention relates to a new device for automatically damping the printing surface and the edges of lithographic stones, so that in machine lithographic printing the required moisture may be imparted to the stone.

MACHINE FOR RAKING AND LOADING HAY.—John Adams, Transfer, Pa.—This invention has for its object to furnish an improved machine for raking and loading hay, which shall be simple in construction, effective in operation, and may be easily attached to a wagon and adjusted to carry the hay to any desired hight.

CARTRIDGES.—Richard J. Gatling, Indianapolis, Ind.—This invention relates to a new metallic-center cartridge, which is so arranged that the cartridge cannot be exploded unless it is struck in the center by the firing pin, or some other sharp instrument, so that the fulminate will be protected from the influence of moisture, and so that no gas can escape through the back of the cartridge when the same is exploded.

PORTABLE FENCE.—John Leonard, Basil, Ohio.—This invention has for its object to furnish an improved portable fence, strong, simple in construction, and easily put up, taken down, or moved from place to place.

GAGE WHEEL FOR PLOWS.—Gaius S. Deane, Grand Rapids, Mich.—This invention has for its object to furnish an improved gage wheel for plows, which shall be strong and durable, and which shall be so constructed that the parts most subject to wear may be readily detached and removed when worn, and replaced with new ones at a trifling expense.

QUILTING FRAMES.—Peter H. Mellon, St. Louis, Mo.—This invention has for its object to so improve the construction of quilting frames as to make them more convenient in use, enabling the quilt to be shifted and the frame taken apart and put together, or adjusted at any desired hight, quickly and conveniently.

LAMP SHADE.—Alfred M. Weekes, New York city.—This invention relates to a new shade for coal-oil and other lamps, which is to reflect the light upon a table or otherwise downward around the light, and at the same time to leave the upper part of the chimney free above the shade, so that the light may also illuminate the room from above the shade.

FANNING ATTACHMENT TO ROCKING CHAIRS.—Augustus R. Hobbs, Elizabethport, N. J.—This invention relates to a new and improved attachment to rocking chairs, whereby a rotating motion is communicated by the rocking of the chair to fans so situated as to cool and refresh the occupant of the same.

ORE FURNACES.—David C. Collier, Samuel Cushman, and Newell E. Farrell, Central City, Col. Ter.—This invention relates to a new and improved method of constructing furnaces for the washing and chloridizing of ores, whereby the same is more effectually and economically done.

STEAM HAMMER.—David Davy, Sheffield, Great Britain.—The object of this invention is to provide means for economizing steam in the use of steam hammers, or hammers actuated by any other elastic fluid, when such hammers are working with varying lengths of strokes.

MASH TUBS.—Leopold Klee, Pittsburg, Pa.—This invention relates to improvements in mash tubs for preparing mash for brewing and other purposes.

HYDRANT.—H. J. Bailey, Pittsburg, Pa.—This invention relates to new and useful improvements in hydrants, which embrace the construction and general arrangement of parts. The provision made for preventing the oxidation of the casing, and for removing the working parts from the case for purposes of inspection or repair.

DRILL CHUCK.—Eli H. Babcock, Canandaigua, N.Y.—This invention relates to an improvement in the method of holding and truing steel drills in lathes and drilling machines, whereby machine work is greatly facilitated, and whereby the process of drilling in iron, steel, or other metals can be much more accurately performed than when done by drills held in the ordinary manner.

DOOR LOCK.—Richard C. Harrington, Newark, N. J.—This invention relates to a new door lock, which is so arranged as to be altogether burglar-proof; this is provided with two key-holes, one on the inside and one on the outside, but not opposite to each other; and is so constructed, that it can at all times be locked and unlocked from the inside, also unlocked from the outside, when it has been locked from the outside; but it cannot under any circumstances be opened from the outside if it has been locked from the inside.

PRINTING INK—Charles Wulsten, Lafayette, Ind.—This invention relates to a new and improved method of making printing ink whereby the cost of the same is greatly cheapened.

HORSE HAY RAKES.—Jonathan Hunsberger, Worcester, Mass.—This invention has for its object to improve the construction of wire toothed horse hay rakes, so that the driver by a simple movement of the foot lever can cause the rake to rise and discharge the collected hay.

MACHINERY FOR SPINNING.—A. L. Houghtaling, Philmont, N. Y.—The nature of this invention consists in a new and useful improvement in a spinning machine for drawing and twisting roping or roving, whereby the thread is drawn out, evenly to any required degree of fineness, which improvement may be employed for spinning any kind of fibrous material.

CLAMP.—Gustavus V. Brecht, St. Louis, Mo.—This invention relates to a machine for boring out the centers of wagon hubs for fitting the boxes thereto, and it consists in the manner in which the clamps or jaws are formed by which the hub is held while the operation is being performed.

SCREEN AND SCOOP.—Agustus Thayer, Albany, N. Y.—This invention consists in a new and improved combination of a screen and scoop, whereby a scoop or small shovel may, with the greatest facility be connected with a screen whenever desired. The invention is applicable to fire shovels, and may be applied to scoops of all kinds.

WASHING AND WRINGING MACHINE.—Robert H. Tomlinson, Brownsburg, Penn.—This invention relates to a new and improved machine for washing or cleansing cloths and for wringing them at the same operation.

STAMPING MILL.—Richard Uren and John Walker, Honghton, Mich.—This stamping or quartz crushing machine is of that class wherein the piston is connected directly to the stamp head, without the intervention of a dummy shaft and crank in which it is desirable to operate the stamp so that it may have no variable throw, effected by an automatic valve movement, and it consists, first, in providing supplementary cylinders and pistons at each end of the main cylinder, to act as cushions against which the force of the stamp piston may be expended without damage, whenever from any cause the piston will be forced against the ends of the steam cylinders. Second, in providing a variable automatic cut-off to regulate the amount of steam admitted to the cylinder for raising the hammer or stamp. Third, in providing an adjustable outlet which may be so graduated as to regulate the discharge of water and pulverized ore from the machine. Fourth, in providing the stamp head with a flange of such shape as to throw the water and pulverized ore against the screens, in a manner more readily to separate the ore and discharge the pulverized portion from the machine. Fifth, in providing through the bottom of the mortar an outlet for those particles of ore which do not become sufficiently pulverized to pass through the screens, and which usually, in the machines as now constructed, become packed in the mortar so as to be difficult to remove.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

Ballston Spa, N. Y.—Twenty dollars received, said to be for second Government fee—no signature to the letter. Who are you?

W. H. B., of Texas.—Several devices have been proposed to overcome the resistance caused by running cars around curves. A divided axle is the well known plan, but it does not work well in practice.

D. L. G., of R. I.—Your electrical thermometer is not new. Such an instrument was described last year in the German Polytechnic Journal.

A. A. R., of Mich.—Your communication in regard to the sun's rising is a good one, but we have already devoted as much space to the subject as we can afford. The question is really one of very little practical value.

D. E. B., of N. Y.—"What should be the thickness of a coiled steel spring—number of wire—to sustain a weight of 300 lbs.?"—Probably the spring meant is a spiral spring. Its suspensive power, without setting, would vary greatly with the temper of the steel and the diameter of the spiral. It is doubtful if a rule could be established covering all the conditions.

C. C. S., of Pa., asks, "What is the process of marbleizing slate and other materials."

C. W. I., of Iowa.—We think Henry Carey Baird, 406 Walnut street, Philadelphia, may furnish you with a treatise on hydraulics which will contain a simple formula for calculating the rise of water above mill dams. Weisbach's formulas are intricate, but we know of none better.

J. C. E., of Miss.—We believe Capt. McClure did sail through a passage at the north of this hemisphere, and we have never seen the statement denied. The existence of a "northwest passage" we believe to be fully established. As to the reward said to be offered for this discovery we are not informed.

C. C. H., of Mass.—The greatest authenticated depth—72 feet—of the descent of a diving bell of which we have any knowledge was attained in the harbor of Portsmouth, N. H., and described in Vol. XXII of the *American Journal of Science*.

N. D. A., of N. Y.—"At a temperature of 212 Fah., the elastic force of steam just equals the pressure of the atmosphere. Does a gage showing a steam pressure of 70 lbs., per square inch indicate absolute pressure, or does it show only the pressure above 212°? In other words do our common spring gages begin to record pressure at 32° or 212° Fah?" Steam gages record the pressure of steam from a point above the equilibrium of the steam as generated and the atmospheric pressure.

L. F., of C. E.—Mix plaster of Paris with water from quicklime and it will be less liable to crack than with pure water. A little glue, dissolved, will not injure it.

J. B. S., of Ga.—"What is the greatest difficulty to be overcome in the construction of aerial machines?" Their direction and propulsion. For the first there is the changeableness of air currents, and for the second the slight resistance of the air. Beside these may be reckoned the impossibility of re-generating a gas of sufficient levity as needed. These difficulties appear to be almost insurmountable.

A. J. W., of Miss.—Fruit or vegetables when to be canned are partially cooked in a water bath and the can containing them suddenly stopped or cemented air-tight. The process requires some care, but can be easily learned. The idea is to expel the atmosphere by steam and before the steam entirely escapes to stop up the can so that no external atmosphere can get in.

E. J. H., of Kansas, asks if the pressure of the atmosphere will affect a belt conveying power from a source two hundred feet distant any more than from a distance of twenty feet. Certainly, the resistance of the atmosphere is greater on a large than on a small surface. In conveying power, however, by means of a belt for long distances it is seldom taken into account.

H. G. R., Jr., of Ill.—We have at present no pamphlet on the application of disinfectants in arresting the spread of the cattle plague. Carbolic acid is the best disinfectant of which we have any knowledge. Refer to past numbers of this paper for further information.

D. W., of Pa.—We are unwilling to give advice in regard to the use of arsenic as a medicine. You should consult an experienced physician. Persons ignorant of the science of medicine and symptoms should avoid dosing themselves with dangerous drugs.

G. H., of Miss.—Your communications are full of curious details, but it would puzzle a Philadelphia lawyer to decipher the peculiar style of writing which you have adopted. The compositer is very liable to grumble a good deal when such copy is put into his hands. If you desire to give publicity to your views you had better issue them in pamphlet form.

EXTENSION NOTICES.

John Mabie, of English Neighborhood, N. J., having petitioned for the extension of a patent granted to him the 3d day of October, 1854, for an improvement in pen and pencil case, for seven years from the expiration of said patent, which takes place on the 3d day of October, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 14th day of September next.

Norman C. Harris, of Poultney, Vt., having petitioned for the extension of a patent granted to him the 24th day of April, 1855, for an improvement in manufacture of slate pencils, for seven years from the expiration of said patent, which takes place on the 24th day of April, 1869, it is ordered that the said petition be heard at the Patent Office on Monday, the 23d day of November next.

Business and Personal.

The charge for insertion under this head is one dollar a line.

For Sale—patent rigging for jib sails—will increase the speed of any fore-and-aft vessel. Patented May 12th, 1868. Address inventor, Fred. Fillingham, Ithaca, N. Y.

Metal small wares of all descriptions made and introduced to the trade. Dies and tools for all kinds of work, brass castings, etc., etc., to order. J. H. White, Newark, N. J.

Stamped brass goods, steel dies, new patent goods, etc., manufactured by T. N. Hickcox & Co., 280 Pearl st., New York.

S. S., Wis.—M. M. Leahp, Milwaukee, is agent for Broughton's lubricators, oil cups, gage cocks, and oilers. Undoubtedly they are the best,

Wanted—Engine 12-in. cylinder, 2-ft. stroke, and boiler to suit. Address H. Gibson, Locust Point, Baltimore.

Adams' improved air cylinder graining machine, in operation daily and specimens of work at 44 Murray st. Send stamp for circular, full particulars, prices, etc. Address Heath, Smith & Co., as above.

For sale—Road or State rights to make and use Blythe & Hayes' patent machine for turning off locomotive crank pins in the wheel. Address W. Blythe and N. Hayes, Alexandria, Va.

The surest detective of low and high water, and high steam in boilers yet invented. Springer, Hess & Co., Philadelphia, Pa.

Bartlett machine and needle depot, 569 Broadway, New York. Needles for all machines, hackle, gill pins, etc.

Merriman's patent bolt cutters—best in use. Address, for circulars, etc., H. B. Brown & Co., New Haven, Conn.

To iron and steel manufacturers.—A gentleman who has given several years to study of metallurgy, mineralogy, chemistry, geology, etc., as also, one year to the manufacture of iron and steel, would be pleased to become connected with some iron or steel establishment on a fair salary. Address, M., box 5686, New York city.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct.

Wanted—manufacturers of tinsmiths' tools, to address Geo. M. Irwin, box 1455, Pittsburgh, Pa.

NEW PUBLICATIONS.

POLAR MAGNETISM.

This is the published paper, by John A. Parker, read before the American Institute, and to which we referred in our criticism on the exercises of the Polytechnic Club, page 297, Vol. XVIII. Our opinion was by no means favorable, and having perused the pamphlet we are more strengthened than ever in our disapproval of its contents. Instead of being a contribution to the stock of knowledge, it is nothing but a confession by its author of his want of knowledge of a subject about which every philosopher of the present day should be well informed, and much more one who aims at giving public readings and issuing publications relating to it. Perhaps we had better state our grounds, in order not to be accused of being too severe or unjust.

The author possesses some information, he has of course read or heard something on the subject, but what he knows about it is very superficial, one-sided, and incomplete. He announces as a great discovery of his own, that the magnetic pole revolves around the geographic pole, and thus ignores entirely that this hypothesis is very old, and by later investigations has been proved utterly inefficient to the full explanation of the so very complex phenomena of terrestrial magnetism. He ignores the existence of the magnetic observatories established at the suggestion of Humboldt in different parts of the earth, and the important results lately obtained therefrom. He ignores the numberless irregularities and anomalies at different parts of the earth's surface, and, for instance, attempts to make out that the determination of the location of the magnetic pole by Captain Ross was erroneous, and because it does not agree with the declination in London, declares that Humboldt was wrong, etc., etc.

Then our author tries to prove, not with facts but with high-faluting words, that magnetism, electricity, and gravitation are all one; he calls the electricity developed by a revolving belt in a manufactory "magnetism," and says: "I have come to the conclusion that what we call polar magnetism is the result of magnetic force rendered active by revolution . . . . a latent force derived from latent principle and put in motion by a forward revolution." Clear as mud, this!

Then he says that the attraction of the needle is toward the center of the earth, and mentions an experiment with a needle magnetized only at one end, which he says will point perpendicularly downward toward the center. The mere mentioning of this experiment, which assuredly he never made but in his imagination, proves that he does not know the laws governing the action of magnetized bars, nor the influence of the earth on them, and that he has only a very obscure notion of the inclination or dip of the needle.

The variation of the compass he thinks to have explained by speaking of cosmical influences, and formally proposes again the long exploded idea of a shifting of the earth's poles, which, according to him, will eventually reach the equator, when that will be a frozen region. He thinks that this theory explains the fossil remains of equatorial plants and animals found near the poles, and thus seems to ignore that La Place has long ago proved the utter impossibility of such shifting of the poles in regard to the earth's mass, and the teachings of geology in regard to the transitions our globe has undergone.

As there is scarcely a page among the thirty-four this pamphlet contains which does not need correction or criticism, we have no space for further comment.

EXPERIMENTUM CRUCIS. By L. S. Benson.

This is a small pamphlet sent us by the author, in which it is at first not clear what he is driving at, but on reading the same it appears that he attempts to demonstrate that the common way of finding the circumference of the circle by the method of approximation, and the results obtained by this method are entirely erroneous. From a false proposition he deduces that the surface of a circle is exactly three times the square of its radius. As this is disproved by the inscribed polygons, which as soon as they have some sixty-four sides or more, are larger than this number, our author asserts that the calculation of these polygons gives an excess above the circle, consequently that the periphery of these inscribed polygons gets, some way or other, outside the circle as soon as they have numerous sides! Now, to show how this can be, he tries to prove that it is always the case in curves, and gives the calculation of the polygons inscribed in a parabola, and by some slight mistake he finds that the inscribed polygon of 512 sides is 0·0027 larger than the parabola itself, and then jumps to the conclusion that the polygon of 32,768 sides must be 0·1418926 larger than the circle in which it is inscribed. The whole reasoning falls utterly to the ground when we take into consideration that the number found by mathematicians by the method of approximation is verified not only by scores of other methods, but also by the most scrutinous practical trials, and by all astronomical calculations; that all thorough mathematicians agree perfectly about this number, and that the disagreement only is to be found among the circle squarers, one of whom found 3 (like our author), another 3⅛, another 3⅕ etc., etc., every one of them starting from false premises, and ignorant of the labor performed before them by others better informed than they.

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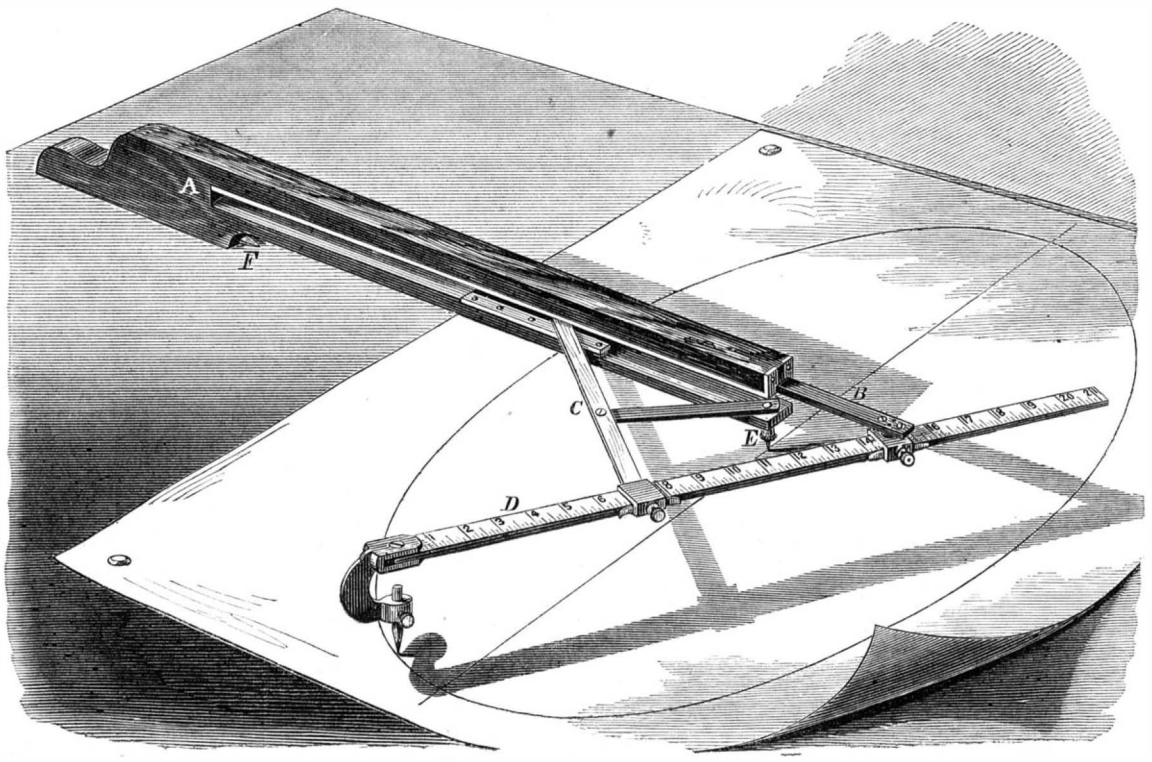
Instrument for Describing Ellipses.

Describing an oval by means of pins, string, and pencil, or by striking two segments of circles and connecting their peripheries, as well as the method by intersecting lines, are but makeshifts, it being difficult to inclose the exact area desired. The device, however, shown in the engraving, gives the means of forming ellipses, of any required size and proportion, quickly and perfectly.

It is a simple instrument, adapted to the trestle of the draftsman, or the bench of the mechanic, easy to handle, and certain in its operation. It is a stock or handle, A, of metal, ivory, box, rosewood, or mahogany, having a slot cut through the greater part of its length, in which slides a bar, B, and a protractor, C, so united to the graded scriber, D, by adjustable sockets of metal, as to insure harmony of the parts in using. One end of the scriber has a swiveled holder for pen, pencil, blade, or diamond, to mark or cut the oval. The arms, B and C, can be set on the scriber to form any size of ellipse within the compass of the instrument, and with any relation to a true circle. At the small end of the handle is a stud, E, which is the center on which the scriber and its parts turn, while a pointer, F, at the end of the slot, determines the line of one axis of the oval, so that it may be drawn exactly where it is wanted.

From this brief explanation it is believed any draftsman or mechanic can understand the operation of this device; its advantages are obvious to all who use drawing materials for drafting machinery, buildings, etc. It is evident, also, that for cutting patterns, where a knife blade is used instead of pen or pencil, it is well adapted. For cutting glass for oval frames also, a diamond taking the place of the pencil, its advantages are evident. The implementis manufactured tc varying sizes and in different styles, to suit the demands and taste of the user. The instrument can be adjusted to draw an oval with its long axis parallel to the stock or handle, as well as with its short axis in the same position.



BOWLY'S PATENT OVAL COMPASS.

The patent for this device was obtained through the Scientific American Patent Agency, January 14, 1868.

Further information may be obtained by addressing the inventor, Franklin Bowly, Winchester, Va., or Augustin J. Smith, Baltimore.

THE PROGRESS OF MECHANICAL INVENTION.

"The times change." We notice the truth of this adage as we glance back over nearly a quarter of a century, and see the vast advances made in one of the specialties of this periodical; that of mechanical improvement. We see our inventors and mechanics taking a higher ground, assuming a higher status, turning their attention from the primer of mechanical and scientific knowledge, proving theories by practical experiments, and using their own powers of observation, thinking, and practice, in preference to accepting the dicta of men of a by-gone age. So long as they adhere in their experiments to well-established laws, even if they use those laws to establish a fact not known to their propounders, they cannot go far wrong. And they may also criticise the experiments upon which those laws were founded and the deductions drawn from them and still be doing "God service," and benefiting their fellow men. But when they choose to ignore the laws which govern matter and project so-called improvements in defiance of those laws, they are simply wasting the time and talents God has given them for useful purposes.

Not long ago one of these "improvements" was brought to our notice by its enthusiastic inventor, who actually claimed to have abrogated the natural and well known law that a force will not yield greater power through the medium of machinery than it first possessed. In vain was it to show—to demonstrate—that the friction of the parts of his machine necessarily absorbed a portion of the original power applied; he insisted that his plan and machine were perfect and that the natural law must be modified to suit his case. Still, even here, we saw the truth of the proposition just made, that our mechanics and inventors were thinking for themselves.

Twenty years ago a mechanic who attempted an improvement in the method or appliances of doing his work was met with discouragements on every side: his fellow workmen, either from jealousy or envy, belittled his work and refused to use his device. Employers looked upon the innovation as a transgression of old time custom and habit, and refused aid to a project which threatened to remove their processes from the well-worn groove and to compel them to a rejection or modification of their appliances. If the inventor took out a patent and expected others to pay for the use of his brain product, he met with discoufagements and rebuffs on every hand. Frequently he was compelled to see his improvement adopted and large fortunes made by its aid while he suffered the stings of poverty and the unpleasant reflection that his ambition was not gratified, as in many cases not even an acknowledgment of his agency in the invention was accorded.

Since that time our people have been educated to that extent that not only the workman but the employer and the consumer have come to recognize the value of improvements and the rights of the inventor. Now a really valuable improvement finds a ready sale and speedy adoption, especially if its claims are properly advertised. We cannot but believe that the SCIENTIFIC AMERICAN has done much toward this education and the recognition of the claims of inventors and the value of their labors. As a means of presenting these claims and as an advocate of the rights of inventors this journal has no superior.

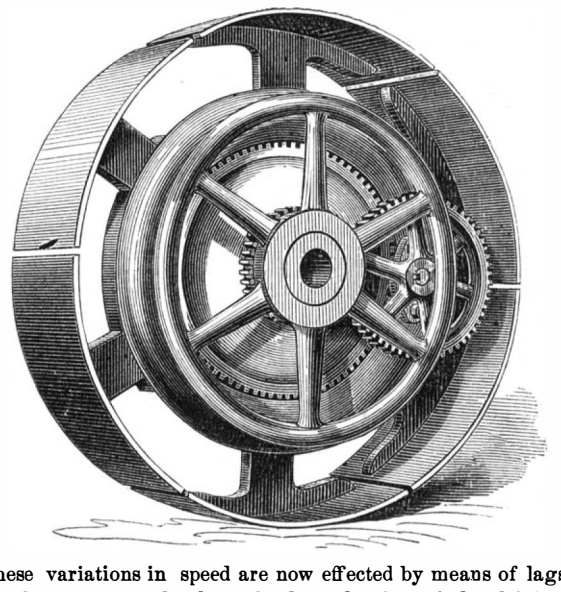
BETTING AGAINST THE WEATHER.

We were told a few days since that a gentleman in this city had won ten thousand dollars in betting against the weather during the past spring. There is some novelty in this, to say the least, and it may be no worse than the very prevalent practice of growling against the weather. When we consider the numerous and rapid changes which take place in our climate, it is a remarkable fact that the mean *temperature* of a place remains nearly the same. The winter may be unusually cold, or the summer unusually hot, while the mean temperature has varied less than a degree.

A very warm summer is therefore likely to be accompanied with a cold winter; and in general, if we have any long period of cold weather, we may expect a similar period at a higher temperature. Usually, however, in the same locality, the relative distribution over summer and winter undergoes comparatively small variations; therefore, every point of the globe has an average climate, though it is occasionally disturbed by different atmospheric changes.

SAVERY'S IMPROVED EXPANDING PULLEY.

In the manufacture of paper there are many causes, well known to those engaged in the business, which render it necessary to frequently alter the speed of the different rolls.



These variations in speed are now effected by means of lags of felt, canvas, or leather glued to the face of the driving pulley, or removed therefrom, as the exigencies of the case demand. This rude makeshift is very unsightly, and entails much labor, as all who have noticed the driving side of a paper machine can testify; it is also very uncertain in its operation, as portions of lagging often become loose and come off, breaking the paper, and necessitating the stoppage of the machine. To keep the lagging in order involves so much effort on the part of the machine tender that he will sometimes allow the paper to break rather than take the time necessary to prevent such an accident.

The design of the improvement herewith illustrated is to provide against these annoyances by an expanding pulley It is so constructed that it can readily be made larger or smaller by turning the hand wheel backward or forward, and this may be done while the machine is in motion. The change of size can be made very gradually, just as the jaws of a scroll chuck can be opened or closed gradually. The pulley is made very strong, is not liable to get out of order, and has been tested by many of our first class paper makers, receiving their unqualified commendations.

Patented through the Scientific American Patent Agency, June 9, 1868, by Thomas H. Savery. All orders or communications for information should be addressed to Pusey, Jones & Co., manufacturers of Paper Machinery, Wilmington, Del.

Transparent Gelatin Prints.

At the last meeting of the Franklin Institute, there were exhibited by Alex. E. Outerbridge, Jr., some transparencies for the lantern, of a novel and effective description. They consisted of impressions from wood cuts, made upon sheets of gelatin directly from the cut, and with as much facility as upon ordinary paper. Mr. Outerbridge has since found that the finest lithographs may be taken upon this substance with the greatest readiness. The only precaution necessary is to print with a dry stone, since gelatin is very soluble in water. The gelatin may made insoluble by mixing with it while fluid a small quantity of bichromate of potash, and then exposing to light. This, however, slightly tinges the otherwise perfectly transparent substance. We have in our possession an impression on gelatin, of the map of the Suez Canal. The finest lines and dots appear perfectly, and with more density than could be obtained in a photograph. This opens quite a new and extensive field for lantern illustration.—*Franklin Jour.*

[Mr. Outerbridge has also favored us with a few specimens. The use of sheet gelatin for the above purpose is quite old. We have had a large number of pictures of precisely the same kind in our possession for more than eight years. Several years ago, we attended a public exhibition of the stereopticon, at which the views produced on the screen were obtained from similar gelatin prints. A panoramic effect was also presented, the pictures being printed upon long strips of gelatin, which were cemented together and stretched between two rollers, in such a manner that by turning a crank the pictures were successively brought before the lenses and thrown upon the screen. Many of the pictures were colored, and beautiful effects produced. We also witnessed, some years ago, a very useful application of gelatin in a school, where the teacher was accustomed to trace small pictures with a pen and india ink, upon strips of gelatin, and then draw them through the magic lantern, thus reproducing the pictures, greatly enlarged, before her class. It is a very simple, cheap, and effective method of instruction. Sheet gelatin, suitable for the purpose, can be had of dealers in artists' materials. It costs about thirty cents a square foot. The expense of the magic lantern is small, and the gelatin pictures may be readily done by hand. A little practice suffices to enable most young persons to make them.—EDS.

"MINARGENT" is the name given to a new substitute for silver, which is said to possess nine tenths of its whiteness, malleability, ductility, tenacity, sonorousness, and density, while it has a superior metallic luster, wears better, is less likely to be acted upon by sulphur in its various forms, and is less fusible than silver. The chief features of this wonderful alloy consist in the introduction of pure tungsten and aluminum, also the considerable proportion of nickel which the inventors have been enabled to alloy with aluminum notwithstanding its known want of affinity therewith. Minargent is composed of 1,000 parts copper, 700 parts nickel, 50 parts tungsten, and 10 parts aluminum. The first three elements are melted together, then run off in a granulated form, and again melted, adding the aluminum and about 1½ per cent of a flux composed of one part borax and one part fluoride of calcium; these proportions of borax are reduced as the fusion proceeds.

A QUEER TRADE MARK.—A company in France manufacturing steel pens have adopted the very singular trade marks which represent the crucifixion of Christ and the descent of the Holy Spirit; each pen is being stamped with these devices. The French have some very queer notions about the use of names for business purposes. Thus, for example, one establishment in Paris is known as the "Store of the Child Jesus," and a competition concern, not to be outdone, has adopted the appropriate title, "Store of the Good Devil." We once remember to have seen a large transparency in front of a mountebank's tent illustrating the birth of our Savior.

MISSISSIPPI planters this year are paying considerable attention to the cultivation of "Havana" tobacco for cigars. The young transplanted plants are reported to be thriving finely.

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VOL. XIX., No. 1....[NEW SERIES.].... *Twenty-third Year.*

NEW YORK, WEDNESDAY, JULY 1, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

*Improvement in Steering Apparatus for Vessels	1
*Improved Burglar-proof Safe	1
A Vine-Growing Town	1
A Wonderful Skull	1
Vegetable Coloring Matters	2
Cutlery—United States Industry	2
Cast Iron Working in Scotland	3
Modern Naval Warfare	3
*A New Jersey Fish Farm	4
*Herring's Center Vent Water Wheel	5
Fell's Railway Over Mont Cenis	5
Editorial Summary	6
Manufacturing, Mining, and Railroad Items	6
Recent American and Foreign Patents	6
Answers to Correspondents	7
New Publications	7
Extension Notices	7
*Instrument for Describing Ellipses	8
The Progress of Mechanical Invention	8
Betting Against the Weather	8
*Savery's Improved Expanding Pulley	8
Transparent Gelatin Prints	8
Balancing of Machinery—The Centrifugal Hydro-Extractor	9
Mind Your Business	9
Reform in the British Patent System	9
The Hoosac Tunnel—Drilling by Machinery	9
Supply of Cold Air to Furnaces for Warming Buildings	9
Tea Dry Plates in Photography	10
The Use of Skilled Labor	10
A Question in Pneumatics	10
Variation of Watches	10
To Repair Worn out Dies	10
A Boiler Test Proposed	10
Loss of Gas—Wet Meters	10
Patent Claims 10, 11, 12, 13,	14
Inventions Patented in England by Americans	14

BALANCING OF MACHINERY.—THE CENTRIFUGAL HYDRO-EXTRACTOR.

On page 361, Vol. XVIII., we spoke briefly of the importance of balancing pulleys, gears, fly-wheels, etc., especially such as received a rapid, rotary movement. In that article we alluded to experiments which were in progress to determine the effect of unequal or eccentric gyration, as compared with a steady rotation. The experiments were made in Havermeyer's sugar refinery, in Williamsburg, L. I., by a trial between the ordinary centrifugal machines used in separating the molasses or sirup from the sugar, and improved machines recently introduced, the great feature of the latter being their power of self or automatic balancing.

These centrifugal machines are probably too well known to our readers to require any detailed description. They are upright, revolving cylinders of fine wire gauze, enclosed in other cylinders with perforated steel sides. The semi-fluid sugar is thrown in and spread on the bottom of the inner cylinder, which is then rapidly rotated, the centrifugal motion throwing the granulated product against the netting, which holds it, while the sirup is permitted to escape through the interstices of the network.

In the establishment where these experiments were conducted, there were seven of these machines of the ordinary make, and seven of the newer pattern. In the former it is necessary that the material should be very evenly distributed over the bottom of the cylinder, or the machine would shake, pound, and tend to throw itself from the center. Now, from the fact that the sugar is put into the machine in a semi-fluid state, it cannot be expected that, however evenly balanced the load might be when first put in, it would so continue for a long time. The new centrifugal machine is self-balancing. It matters not whether the load, when first put in, is on one side, or that it afterwards becomes one-sided; the machine adapts itself to these varying circumstances, and uniformly maintains its balance. Of course, there must be less wear on the machinery, less friction, and less power required to do the work.

The experiments to which we have referred were conducted with great care, and the results shown below are the mean of three experiments on different days. All the machines were driven by the same engine, through the same line of shafting. The seven old style of machines made about 1,000 revolutions per minute, with an aggregate load of 1,451 lbs., and in running seven minutes discharged 869 lbs. of sugar; the power required being 32·27 H. P. by the indicator.

The seven self-balancing machines, with an aggregate load of 2,093 lbs., running 1,200 revolutions per minute, discharged 1,219 lbs. of sugar; the power absorbed being 22·48 H. P., running, as the others, seven minutes.

Thus, it will be seen, here was a saving of power of 30·34 per cent; gain in product of 30·68 per cent; and superior sugar in dryness of 1·11 per cent, being total in favor of the improved machine a saving of 62·13 per cent. This result was not anticipated by the proprietors of the establishment, even if it was contemplated by the inventor. It was well known that the new machine could do a larger amount of work in the same time than the machines of the old style, but it was believed there would be a corresponding expenditure of additional power. Yet the result showed a less expenditure of power with a larger amount of work performed.

Mechanics may ask, "Why is it that the simple balancing of a machine will save so large a percentage of power as as shown by the result of these experiments?" Perhaps it is easier asked than answered. But suppose an upright cylinder revolves at such a rate its surface moves two miles per minute, and that a shot of two pounds weight be placed in it. Liberate the shot, and it flies off at a tangent with a force proportioned to the weight of the shot, plus its velocity. Now would not the same amount of force exist if the shot was confined to the interior of the cylinder; in other words, does it not require as much power continuously to retain that shot from flying off, as its flying off would give out instantly? If so, we shall have no difficulty in acccounting for the great saving of power by the balancing of the machine, especially if we take into account the excessive friction engendered by eccentric gyration at a high speed.

This improved centrifugal machine is adapted to the drying of clothes in laundries. After the clothes are washed they are put into the cylinder, a jet of warm water is introduced for rinsing, the machine put in motion, and the water, by centrifugal force, is thrown out; the water is shut off, the clothes, after revolving a sufficient time, are taken out nearly dry—just fit for ironing.

It is excellent, also, for woolen manufacturers to dry their wool, after its being washed and colored, and also for bleachers to dry their goods; for tanners to extract the tannin remaining in their spent bark, after it is taken from the vat.

MIND YOUR BUSINESS.

That economic philosopher, Benjamin Franklin, proposed for one of our national coins the legend which forms the heading of this article. For the people of this country, then and now, it had and still possesses a peculiar significance, and its value is not impaired by the circumstances of locality or time. Its observance would remove one great hindrance to progress, and aid in the development of individual exertion. Yet no man can undertake any new enterprise without being over-burdened with, and nearly overwhelmed by gratuitous advice.

If a man invents a machine or improves on any mechanical device, straightway he has a number of advisers who can tell him where he has failed and how he may perfect. If one is ailing it is a curious fact that every friend to whom he reveals his annoyance is a medical adviser and can tell him exactly what to do to find relief. If an accident occurs demanding prompt action and amendment, all the bystanders assume to become directors of the job, and are profuse with advice, but very chary of help.

Probably this disposition to offer unasked advice is shown nowhere so prominently as in the workshop. If a workman has a difficult job to perform he finds plenty of advisers, mainly those who, having had no similar experience, can use conjecture instead of fact for a guide. The objects for this gratuitous advice are usually singled from green apprentices, or journeymen new to the ways of the shop. They are considered fair game—proper subjects for experiments—and are tormented, annoyed, and bothered by repeated, antagonistic, and foolish counsel. In mechanics, and in any trade or vocation, it is a matter of pride to the workman to compass his deliverance from an annoying position by his own exertions. A proper pride impels him to prefer his own unaided exertions to the assistance of voluntary teachers. When he needs counsel—the riper experience of his seniors—if he is not foolishly independent and self-willed, he will ask it. When desired is the time when it is valuable to him. But every man knows that he achieves a greater triumph and a more solid and enduring knowledge by "working out his own salvation" than by depending upon others for assistance.

Undoubtedly the proffers of assistance are often incited by a pure desire to aid; but aid is not appreciated if the recipient does not see his need of it; yet it is always welcome when wanted, and then it will be asked for. If every one attended strictly to his own business, not only would there be more harmony among workers but greater progress would be made in all the improvements designed to aid the race.

REFORM IN THE BRITISH PATENT SYSTEM.

An influential committee of engineers recently waited upon Mr. Disraeli for the purpose of suggesting some improvements in the management of the English Patent Office. It appears from the representations made by some of the members that applicants for patents suffer serious inconvenience from the fact that they cannot, without great trouble and expense, ascertain about the novelty of a supposed new invention. It was suggested that three additional Commissioners of Patents should be chosen from practically scientific institutions, one to be a mechanical engineer, one a chemist, and one to represent science generally; also that there should be comprehensive subject-matter indexes prepared to embrace not only patented inventions, but also references to scientific books generally. It appears that the gross annual revenues of the Patent Office amount to $600,000, while the expenses are not over $250,000, therefore it was urged with great force that some of this surplus should be used to increase the efficiency of the office. One of the speakers stated that there was an accumulation of nearly $1,700,000 over and above that intended as revenue, and yet, strange to say, not one of the speakers suggested a reduction of the unreasonable fees now required from applicants for patents.

Mr. Disraeli assured the deputation that the government would give consideration to the subject. We hope, therefore, that the scientific press of England will urge the importance of a considerable reduction of the charges. It is a gross injustice to tax inventors so heavily for their patents.

THE HOOSAC TUNNEL—DRILLING BY MACHINERY.

It is well known that the boring of the great tunnel of Mont Cenis and also of the Hoosac Mountain is done by machines driven, in both cases, by compressed air. A brief description of the machine used in the latter locality may be interesting. It is the invention, we believe, of Mr. Joseph W. Fowle, of Boston, Mass., but as used in the tunnel has been somewhat modified. His machine is now employed in removing obstructions at the Narrows off George's Island, Boston Harbor, and also on the Union Pacific Railroad.

It is simply a small steam (compressed air) engine, on a bed similar to that of any ordinary horizontal engine, the bed carrying the cylinder, steam chest, slides, crosshead, and piston rod; the latter in this drilling machine is extended and forms the drill proper, sliding through a guide on the end of the frame furthest from the cylinder. The bed with its attachments is suspended by trunnions in boxes which fit in the uprights of a frame, so that the machine may be raised or lowered to suit the elevation where the drilling is to be done. The trunnions also allow the adjustment of the drill at any angle to a horizontal plane. The uprights supporting the machine are mortised into a horizontal bed, which slides on another horizontal carriage, and can be moved back and forth by rack and pinion or similar device, worked by hand or automatically. The turn of the drill between each stroke is effected by the simple mechanism of bell crank and lever or by ratchet and pawl, while the feed of the drill is governed by a screw or rack and pinion.

The parts are simple and strong and all the actuating portions of the machine have a direct motion. If steam is used as a motor the boiler is mounted on the carriage, and the connection between the steam space of the boiler and the steam chest is by means of jointed pipes. In the Hoosac tunnel the drills are driven by compressed air, the power being derived from water wheels.

SUPPLY OF COLD AIR TO FURNACES EMPLOYED FOR WARMING BUILDINGS.

In no department of mechanical construction is an accurate knowledge of the physical laws involved more necessary than in the construction of apparatus for heating and ventilating buildings; and so far as our observation extends, in no other department does greater ignorance prevail. There are, indeed, many inventors, architects, and engineers who are thoroughly posted upon the subject, but the majority of those throughout the country, who, for the most part, are intrusted with the putting up of such apparatus, know little or nothing of the first principles upon which their art depends. Of the true nature of heat, of radiation, convection, or conduction, their practice gives no sign of recognition; and the nature of the impurities which accumulate in rooms crowded with people, and the proper method of removing them without subjecting the occupants to piercing drafts and currents from open windows, are unsolved problems.

There stands in a building in this city a monument of the ignorance of such a bungler: a stove and furnace combined, with flues open at the top and surmounted with a pipe through which not hot air (for there are no openings at the bottom of the flues), but *heat* is expected to rise to the room above. But the heat obstinately refuses to obey any other law than that which nature imposes, and, save a slight warmth, totally due to radiation, the register above the pipe has no more to do with the warming of the apartment into which it opens than the spittoon. If, upon this mechanical abortion, were inscribed the names of those artizans who do not know that heat, in itself, does not rise, any more than it falls, or moves laterally, and that the supposed rising of heat is nothing but the ascension of air, rendered lighter because it is heated, it would not afford room for the list, though the letters should be microscopic. If, upon upon such fundamental principles, a want of knowledge prevails, how is it to be expected that anything should be known of the effects of currents of air over the mouths of tubes upon the contained columns, of such great import to the satisfactory working of any apparatus involving the circulation of air through flues and passages. The most that can be expected of such workmen, is that they should know that a chimney would cease to draw when it becomes stopped, or that a stovepipe should not have too many elbows.

We have seen heaters with the hot-air registers lower than the source of supply for cold air, the hot-air registers being immediately at the top of the furnace. We have seen them placed so that the hot-air column, if it discharged itself at all, must do so against the pressure of air in a close room, there being no possible escape for the contained air except at the cracks beside the windows and doors. We have seen the cold-air boxes placed at obtuse angles, with narrow passages between buildings, so that when the wind blew strongly between them, the current would be reversed and the entire column of heated air would pass into the atmosphere outside; and we have seen such furnaces with a fire box of an inch and one-half in thickness, glowing like a cherry, while the register over the furnace was actually cold to the touch.

An observation of such particulars will explain the reason why bills for fuel are often so heavy; why heaters will often work well when some particular wind is blowing; and why, when some rooms are over-heated, others supplied from the same heater are uncomfortably cold.

The season for repairs and renovation of such appliances is usually the middle of summer, when public buildings are unoccupied; and those in charge of such repairs should observe carefully the following particulars:

The furnace should be incased with a good non-radiating material. Galvanized iron is commonly used, but it is not as perfect as is desirable, and it is to be wished that something better could be hit upon. It is no uncommon occurrence to find the basement, in which the furnace is placed, the warmest part of the building. Flues for conveying the cold air of the building to the fire boxes should also be supplied, so that when the fires are first lighted, the cold air can be supplied

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from the rooms themselves. As soon as the volume of air in the building is raised to the proper temperature, these can be shut off, and a supply of pure air from the outside substituted. The smoke pipes should be large; much larger than is usual. It is not uncommon to see a six or seven inch smoke pipe attached to a furnace having a fire box capable of holding a charge of 150 lbs. of coal. Such a fire box requires a a pipe at least eight or nine inches in diameter to properly avoid the permeation of the air by the gases of combustion. If the external openings of the cold-air boxes are where they are subjected to strong winds,they should be fitted with cowls. Blasts of wind will then aid the passage of air to the heaters, instead of reversing the currents.

When different rooms are to be supplied from the same heater, the conducting flues should never be at right angles with each other. When rooms are warmed by heated air, ventilation should take place from the bottom, never from the top of the room.

It requires no small skill to properly adjust all these requisites, and they should not be left to the care of ignorant or careless workmen. A timely and proper attention to them will more than repay the necessary expense.

The lectures upon heat by Prof. Tyndall, now in course of publication in The Wheel, will be found an invaluable aid to those who wish to gain true theoretical and practical ideas of the subject.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Use of Skilled Labor.

Messrs. Editors:—I was somewhat gratified to learn from your last issue, page 340, that the scarcity of first-class workmen had attracted your attention. The causes you assigned for the deterioration are correct so far as they go. To say we could not produce as good workmen as formerly with our extended knowledge and increased facilities would be entirely erroneous. We do produce as good workmen and more of them, but they do not adhere so long to their trades. The writer, in referring to his acquaintances and former shopmates, can recall eleven of as good workmen (finishers and pattern makers) as the country could produce; all of them were graduate mechanical draftsmen. Of the number, but one (a pattern maker now in the Washington Navy Yard) is following his trade; three are in the Engineering Corps United States Navy, two are superintendents of mechanical establishments, one an engineer in the merchant service, while four are following other pursuits; all of this has occurred within ten years. I venture the assertion that the parsimony of employers, instigated by their desire to produce work as cheap as possible regardless of quality, and their preference for inferior workmen, when they will work for reduced wages, do more to compel first-class workmen to vacate their trades than any other cause.

A young man may have a natural inclination for a mechanical business; he will go to a trade, working through the day and studying through the evening, will acquire the laws and principles of mechanics, will train his eye to almost mathematical precision, will cultivate his hand to guide the instrument in the path of his eye, but when he becomes of age he is offered mere "hand to mouth" living wages. The consequence is he soon becomes disgusted with a trade, and seeks employment in a more remunerative business.

Another cause arises from the arrogance and intolerance of some trades unions, in demanding that all hands should be paid the same wages instead of according to their merits. The employer not being disposed to pay all as first-class hands, and the pay offered not being adequate for a first class hand, the good workman will seek employment elsewhere, often in other pursuits.

Still another cause which tends to the deterioration of mechanical skill, is the iniquitous manner in which some of our public manufactories are conducted, where the drone is placed equal to the meritorious and often above through favoritism. Those things are humiliating to a first-class workman, while they have no tendency to stimulate the inferior one to improve himself. The Government should be able to command the best mechanical skill of the country, but it is notorious that the skill in our navy yards, with a few exceptions, is very inferior; very good workmen generally preferring private establishments than to be classed with drones.

J. J.

Baltimore, Md.

Tea Dry Plates in Photography.

Messrs. Editors:—You have frequently published formulas for dry plate photographic processes, which I have tested in common with other professional and amateur photographers, with varying success. I will confess, however, that with all my long experience, I have found none that gave me entirely satisfactory results. The tannin plates were partially successful, but the many favorable conditions required for chemicals, atmosphere, light, etc., make the process almost impracticable. The acetate of morphine (one grain solution poured upon the sensitive plate, after thoroughly washing with water) gave more satisfactory results for twenty-four or forty-eight hours after sensitizing than any thing else, until one day last week, testing an excellent brand of English breakfast tea, it occurred to me to try it as a photographic preservative. Take eight ounces of tea of the ordinary table strength, and dissolve about three drachms of crystallized or lump sugar. When dissolved, filter, or let settle, until cold. When clear, use it precisely as in the acetate of morphine process. Sensitize the plate in the ordinary manner, and thoroughly wash with clean water; then flow it with the tea solution two or three times, and set it away in a dark closet to dry spontaneously. When dry, expose the plate on the view about four times as long as in practicing the wet process under similar circumstances. After exposure, wash the plate with water and flow it with a fifteen grain solution of nitrate of silver. Drain for a moment, and develope with proto-sulphate of iron solution, of the usual strength, or with pyrogallic acid. I much prefer the latter. The following is a good formula:

Pyrogallic acid, 2 grains; citric acid, 1 grain; glacial acetic acid, 10 minims; water, 1 ounce. Add no silver to the developer until it is found necessary to force the development to obtain the proper density. Use the plates within two or three days after preparing them.

How long these plates will retain their sensitiveness I have not had time to determine. I send you a print from a negative made the third day after the plate was prepared. It was exposed with a dim light, late in the day. A plate prepared at the same time with acetate of morphine, and exposed upon the same view at the same time, gave a result much less satisfactory.

I should be pleased to know the results obtained by parties who have opportunity to try the "Black Tea Process."

Geo. G. Rockwood.

New York city.

[The use of tea in the preparation of dry plates is not new. It is probably the tannin, of which there are thirteen parts in black tea, which renders the tea solution useful in preserving photographic plates.—Eds.

Variation of Watches.

Messrs. Editors: I have been much interested in the articles you published on watches. I have noticed something strange in the behavior of watches, considered good ones; that is, they would lose from two to two and a half minutes in twenty-four hours after being carried on rail cars for several hours. This loss would continue for a time, but whether permanent or not I cannot say. I noticed this discrepancy in my own case, but did not attach much importance to it until my attention was called to it by others. I am anxious to learn if your author has ever noticed anything similar, and his opinion thereon.

David Shive.

Philadelphia, Pa.

To Repair Worn-out Dies.

Messrs. Editors.—Noticing in the Scientific American many hints that in practice prove valuable, I write the following, thinking perhaps it may be of interest to some of your readers.

To make worn-out solid screw dies cut equal to new: After the threads in a die become worn and dull it may be tapped larger by screwing a piece of wood into the thread and filling the holes or grooves with melted Babbit metal or lead; this will prevent a tap from catching. A die when used for some purposes may be upset sufficiently to allow a full good thread to be cut of the original size, but by this process old dies that are in many cases thrown away may be quickly and cheaply made equal to new.

Thomas H. Worral.

Woonsocket, R. I.

A Boiler Test Proposed.

Messrs. Editors—I would suggest through the agency of your valuable paper, that, at the Exhibition of the American Institute next fall, all patent steam boilers be tested, to ascertain which boiler, burning the least amount of fuel, will produce the most power. The proper way to test them would be to have a tank full of water in which a propeller wheel of coarse pitch connected to a 40-horse engine is arranged to work. The boiler that gets the greatest number of turns out of the wheel with the least consumption of fuel should be pronounced the champion boiler.

If a test of this kind takes place, I for one will furnish a 40 horse boiler of my patent.

H. Leslie.

Jersey City, N. J.

[Our correspondent makes an excellent suggestion, which we hope may be carried out—Eds.

Loss of Gas---Wet Meters.

Messrs. Editors:—On page 338, of Volume XVIII., in speaking of the losses sustained by consumers of illuminating gas, when using "wet meters," I think you omitted to speak of a source of loss which is very liable to occur. It is as follows:—

When the consumption is large, and the working of the axle easy, a momentum will be acquired by the drum, so that the buckets will be only partially filled as they pass over to the supply pipe. The register records the same as with full buckets.

H. H. Y.

Philadelphia, Pa.

A Question in Pneumatics.

Messrs. Editors: Air is 850 times lighter than water, and the pressure of the atmosphere is sufficient to sustain a column of water 33 feet high. Now, if were possible to submerge a quantity of air in the sea to a depth of 28,050 feet and then set it free, would the air still possess buoyancy, and would it rise to the surface of the water?

B.

To See Through a Grindstone.—The following curious optical illusion may be new to some of our readers. Roll up a piece of stiff paper in the shape of a tube, with one end just large enough to fit round the eye, and the other end rather smaller. Hold the tube between the thumb and finger of the right hand (do not grasp it with the whole hand); put the large end close against the right eye, and with the left hand hold a book, or any convenient opaque body, against the side of the tube. Be sure and keep both eyes open, and there will appear to be a hole through the body, and objects are seen as if through the hole instead of through the tube. The right eye sees through the tube, and the left eye sees the object, and the two appearances are so confounded together that they cannot be separated.

The Calabar Bean, one of the Paris journals asserts, has been found to be an antidote to strychnia. The latter destroys by spasmodic contraction; the former when taken alone paralyzes, and consequently neutralizes the action of strychnia if given after that poison. The calabar is the ordeal bean used by the negroes of western Africa in determining the guilt or innocence of accused individuals, a test the effect of which is to immensely swell the criminal lists, as it almost invariably proves fatal, the individual only escaping when vomiting is produced—a rare occurrence. The most interesting effect of the Calabar bean is that of contracting the pupil of the eye, whereby distant objects are apparently magnified and seen nearer, and it is now considerably used for increasing the power of accomodating the eye to distances.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING JUNE 16, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

78,854.—Pump.—Wm. Adair, Liverpool, England. Patented in England, April 5, 1867.

I claim the combination of the open and closed cylinders, the latter provided with a valve cover and plunger, the two operating by means of valves, and a feed pipe, and a branch thereof, substantially as described.

78,855.—Music Type.—Edward L. Balch, Boston, Mass. Antedated June 4, 1868.

I claim the wooden type for printing musical charts, provided with right-angled shoulders, B, overlapping each other, whereby continuous and unbroken lines for the musical staff and notes are formed, as herein shown and described.

78,856.—Plow.—Leonard W. Beal (assignor to himself and A. D. Drew), Dixon, Ill.

I claim, 1st, A plow plate, A, constructed substantially as described, so as to dispense with a land slide and separate point, and operating as specified and described,

2d, The plow plate, A, when constructed in the curved form, symmetrically before and behind its point of attachment to its standard, so as to operate and be reversible, substantially as described and shown.

3d, The combination of one or more plows, A, constructed substantially as described, with a frame, C, and wheels, W, substantially as set forth.

4th, Securing the axle, E, to the frame, C, in such a manner as to be adjusted at pleasure, to vary its direction across the frame, substantially as herein set forth and described.

78,857.—Hens' Nest.—Samuel S. Bent, Portchester, N. Y.

I claim, 1st, A metallic hens' nest, formed with rounded corners, and with the rib, g, at the front end, as and for the purposes specified.

2d, The lighting shelf, p, in combination with metallic hens' nest, formed as aforesaid.

3d, The side partitions, h, combined with the metallic hens' nest, to separate one nest from another, as and for the purposes set forth.

4th, A movable door or window, K, in combination with the frame and hens' nest, to give access to the same from outside the coop, substantially as set forth.

78,858.—Pepper Box Top Fastener.—Jas. Bounds, Bridgeport, Conn.

I claim forming a single piece of spring wire, U-shaped, and securing one end of it to the under side center of a box or bottle top, so arranged that said lid will rest upon the top of the bottle, as and for the purpose set forth.

78,859.—Heating Buildings.—Thomas Boyd, Allegheny City, Pa.

I claim the arrangement of the flues, 1, 2, 2' and 4, fireplaces, m and n, air chamber, 3, and valve, o, the whole being constructed, arranged and operating as herein described, and for the purpose set forth.

78,860.—Method of Lowering Cylinders.—Geo. R. Bramhall, Chicago, Ill.

I claim, 1st, The combination and arrangement of the inclined way, D, hinged at the bottom as shown, and the hinged adjustable platform, D', with its means of elevation and depression, substantially in the manner and for the purposes specified.

2d, In combination with the above, the clamps, F f, operating in the manner and for the purposes set forth.

3d, In combination with the hinged platform, D', and ways, D, the linked rods, h, arranged to operate as and for the purposes described.

4th, The frame, L, with its movable bars, M N, in combination with the ways, D, and frame, I, arranged in the manner and for the purposes described.

78,861.—Wrench.—Daniel W. Colburn, Loami, Ill.

I claim this improved construction of the jaws, A and B, in the manner herein specified, and for the purposes set forth.

78,862.—Forging Machine.—Josiah Copley, Jr., Allegheny City, Pa. Antedated June 4, 1868.

I claim, 1st, Operating the dies, J and K, by means of the slotted lever, C, arm, D, and cam, P, constructed and arranged substantially as herein described, and for the purpose set forth.

2d, The combination of the treadle, l, connecting rod, n, and shifting guides, m, when used in connection with the cam, P, arm, D, and lever, C, as herein described and for the purpose set forth.

3d, The guides, l, when used in combination with the dies, J and K, as herein described and set forth.

78,863.—Machine for Grinding Knives of Mowing Machines.—M. C. Cronk (assignor to himself and W. Boynton), Auburn, N. Y.

I claim, 1st, The combination of the plates, D and E, arranged to operate as and for the purposes specified.

2d, Lever G, rod, k, and spring, l, all combined and operating substantially in the manner and for the purposes set forth.

3d, The combination of lever, G, screw, m, and spring, h, arranged and operated substantially as and for the purpose specified.

4 h, The combination of lever, G, bolt, P, bars, L and M, arranged and operating substantially for the purpose set forth.

78,864.—Method of Locking Nuts.—David Cumming, Jr., New York city.

I claim the key, of lead or other similar soft metal, when constructed and applied substantially as herein described and for the purpose set forth.

78,865.—Device for Attaching Pumps to Barrels.—Jose F. De Navarro, New York city, assignor to Emery Rotary Machine Co.

I claim the clamping sleeve, A, of two or more parts, dowelled together, and of conical exterior, with internal griping ribs or projections, for clamping the suction pipe of the pump, substantially as shown and described for the purpose set forth.

78,866.—Composition for Preparing Sizing.—James Dodd (assignor to himself and George Brown), Providence, R. I.

I claim the above described composition, as well as its combination with starch or sizing, for warps.

78,867.—Drop Press.—James Duff, Peoria, Ill.

I claim the following hammer, B, air chamber, b, air passage and stop cock, d, and plunger, a, in combination with the hammer, A, when arranged in the manner and operating as and for the purpose herein described.

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78,868.—SINGLE-TREE BRACE.—C. R. Elmer, Bridgeton, N.J.

I claim the combination and arrangement of the chain, B, and brace, E, with the beam, A, and single tree, F, substantially upon the principle above described and for the purpose set forth.

78,869.—PLOW.—Charles M French, Rochester, Pa.

I claim so constructing a plow as that the joint between the share and mold board shall be about on a line at right angles to the plane of the share bar or land side of the plow, said joint being so arranged with relation to the share and mold board as to give depth and strength to the forward part of the share bar, and also so that the several parts may be duplicated, the whole being constructed, arranged and operating substantially as herein described and for the purpose set forth.

78,870.—MANUFACTURE OF ILLUMINATING GAS.—George P. Ganster, New York city.

I claim, 1st, In an apparatus for carbureting air, the arrangement of the inner and outer drums, D and F, through which the air passes from the pump, A.

2d, The combination and arrangement of the carbureting apparatus shown and described, with the air forcing apparatus in the same case or cylinder, substantially in the manner set forth.

78,871.—GAS BURNER.—Sam'l Gardiner, Jr., New York city.

I claim, 1st The combination of the coil, C, with a key, D, formed with one or more notches, apertures, or grooves, as at d, so as to permit a slight leakage of gas when the main supply is turned off, as shown and described.

2d, The combination of the coil, c, or its equivalent, with the hood or cap, B, substantially as and for the purposes specified.

78,872.—SUSPENDER.—Alexander W. Harris, New York city.

I claim, 1st, A suspender or brace, substantially such as described, consisting of a single piece of webbing, leather, cloth, or equivalent material, passed through and sliding freely in two button-strap loops, and the two ends connected by a buckle or equivalent means, by which the length can be adjusted at pleasure, as and for the purpose described.

2d, As a new article of manufacture, a suspender or brace consisting of a single piece of webbing or other equivalent material, constructed substantially as described, in combination with a slide to secure an adjustable crossing of the webbing or other material, substantially as described.

78,873.—COMBINED INFLUX AND VENT VALVE.—J. H. G. Hawes, Newark, N. J.

I claim the arrangement with the pipe, A D, of the two valves, C E, separate and independent of each other, adapted to operate substantially as and for the purpose described.

78,874.—COMPOSITION FOR THE MANUFACTURE OF BEER, ALE, PORTER, ETC.—Thomas Hawks, Rochester, N Y.

I claim as a new product the extract of malt and hops, or, as I term it, concentrated wort, prepared in suitable proportions for the manufacture of ale, beer, and other malt liquors or beverages, when condensed to a syrup or substance of thick consistency, substantially as herein described, either with or without the addition of gelatin, or with or without the addition of cane sugar, substantially in the manner and for the purpose herein set forth.

78,875.—CONCENTRATED MALT EXTRACT.—Thomas Hawks, Rochester, N. Y.

I claim as a new product or composition of matter, the extract of malt, or, as I term it, concentrated malt, when condensed to a syrup or substance of thick consistency, substantially as herein described, either with or without the addition of sugar cane, or with or without the addition of gelatin, substantially in the manner and for the purposes herein set forth.

78,876.—BED BOTTOM.—Winford R. S. Hunter, Blackberry Station, Ill., assignor to himself and H. T. Rockwell.

I claim the combination of the cross sill, A, springs, a a, slats, B, blocks, D, slats, C, with the slots, c, and elastic strap, b, all arranged in the manner and for the purposes herein set forth and shown.

78,877.—CHURN.—F. A. Jewett, Shrewsbury, Mass.

I claim, 1st, The combination, with the cylinder, I, of the stationary arms or floats, N, substantially as and for the purposes set forth.

2d, The combination of the stationary arms, N, with the stationary shaft, K, substantially as and for the purposes set forth.

3d, The combination, with the cylinder, I, of the stationary shaft or spindle K, and stationary arms, N, or their equivalents, substantially as and for the purposes set forth.

4th, The combination, with the stationary shaft, K, and one of the arms, N, of the air or vent hole, f, substantially as and for the purposes set forth.

5th, The combination of the cap g, with the vent arm, N, substantially as set forth

6th, The combination, with the cylinder, I, and spindle or shaft, K, of the flanged or hub pieces, b c, substantially as and for the purposes set forth,

7th, The combination and arrangement, with the cylinder, I, of the arms, R R, spring bar, P, screws, w w, and cover, O, substantially as and for the purposes set forth.

8th, The combination, with the cylinder, I, of the holding screw pad, 17, substantially as set forth.

9th, The combination, with the front frame pieces, A A, and brace, E, or its equivalent, of the swing table or shelf, G, substantially as and for the purposes set forth.

78,878.—DISTILLING PETROLEUM.—Arthur Kirk, Allegheny City, Pa. Antedated February 10, 1868.

I claim, 1st, Effecting a continuous distillation of petroleum, or other distillable substances, by causing it or them to flow through a succession of stills, giving off in each still the more volatile ingredients, the stills being connected with trap pipes, x y z, etc., so as to prevent the backward flow of the substance to be distilled, substantially as above set forth.

2d, A nest or battery of stills, for purposes of distillation, two or more in number, connected together by pipes, each pipe leading from the upper part of one still to the lower part of another still, substantially in the manner and for the purposes above set forth.

3d, In connection with a still, for distilling petroleum, and other distillable substances, the use of a float, s, with suitable index lever, l, arranged and operated substantially as and for the purposes hereinbefore set forth.

78,879.—WATER WHEEL.—Thomas Leffel (assignor to himself and Henry C. Barnett), Springfield, Ohio.

I claim, 1st, A wheel, formed of a series of single floats, the faces of which are constructed in the form described, and which are centrally attached to the ring, K", and arranged to receive and discharge the water, substantially in the manner set forth.

2d, The combination of the floats, L, and ring, K", when respectively constructed and connected, substantially as set forth.

78,880.—GUIDE FOR BAND SAWS.—John Lemman (assignor to J. A. Fay & Co.), Cincinnati, Ohio.

I claim the combination of the roller, b, with fixed lateral guides, c c c, one or more, arranged and operating substantially in the manner and for the purposes specified.

78,881.—NURSING BOTTLE.—H. W. Libbey, M. D., Cleveland, Ohio.

I claim, 1st, The disk, A B, provided with central and marginal openings, C D, for the purpose specified.

2d, The elastic covering, F, in combination with the disks, A B, for the purpose set forth.

3d, The tube, H, shell, G, valve, b, and elastic tube, I, all constructed and arranged to operate in the manner and for the purpose substantially as set forth.

78,882.—MACHINE FOR CUTTING STAVES.—Henry Martin, Galveston, Ind.

I claim the cutters, E E, constructed as described, attached to the fingers, C, of the stave machine, extending above their upper ends, and having an inclination inward and obliquely over the top edge of the stave, thereby beveling or chamfering its ends, as herein shown and described.

78,883.—TRUCK FOR MOVING HOUSES.—John S. Millikan, Thorntown, Ind.

I claim a truck for moving buildings, having traverse bars, c c, bolts, d d d d f f and g, and bolsters, e e, constructed, combined, and arranged substantially as herein specified.

78,884.—SEWING HORSE.—Mortimer B. Mills, De Witt, Iowa. Iowa.

I claim, 1st The feeding slide, and the manner in which it is worked.

2d, The mode and operation of punching the holes.

78,885.—WATER INDICATOR FOR STEAM GENERATORS.—William Moore, Kokomo, Ind.

I claim the arrangement of the hollow valve, Y, with its side apertures, S, the sleeve, o o, connecting rod, R, lever, D, and the float and its rod, B, all constructed, arranged, and operating substantially in the manner herein specified.

78,886.—STAGING.—Duncan Morrison, Portland, Me.

I claim, 1st, The combination, with the center standards, of the levers, c, and spring catches, d, connected with the platform, B, in the manner and for the purpose herein set forth.

2d, In combination with platform, B', the crank, o, pulley, p, cord, v, shaft, q, and cords, t u, as and for the purpose herein set forth.

3d, The combination of cranks, k, cords, k' and springs, i, connected with the cranks, k, as described, and for the purposes set forth.

4th, The combination of the bars, m, with the clamps, n, and springs, h h, on the platform, to release the said springs, as and for the purposes herein set forth.

5th, The combination and arrangement of the staging, so that it may be folded, as herein described, in the manner and for the purposes set forth.

78,887.—ERASER.—William A. Morse and John G. Powell, Philadelphia, Pa.

We claim an eraser blade made from thin sheet metal, when the same is stiffened by corrugations as shown and described, for the purpose set forth.

78,888.—SHOE LACING DEVICE.—Henry L. C. Muller, Bridgeport, Conn. Antedated June 2, 1868.

I claim a spring holder, D, for shoe lacings, made and operating substantially as herein shown and described.

78,889.—HARVESTER CUTTER.—John T. Norris, Tiffin, Ohio.

I claim, 1st, The knife, B, provided with slot, b, and lug, d, substantially as and for the purposes herein set forth.

2d, The combination of the knife, B, as constructed, with the bar, A, provided with pins, a a, set screws, e and f, and wedge, C, or their equivalents, substantially as and for the purposes herein set forth.

78,890.—WARMING CLOSET ON COOKING STOVES.—Daniel E. Paris, Troy, N. Y.

I claim, 1st, A warming oven to a cooking stove, situated underneath and supported by the bottom of the same, situated between and in combination with the supporting legs of the stove, when made in framework and constructed substantially as herein shown and described.

2d, In combination with the warming rack below, and the reservoir seat above, a hot oven or closet, made in framework, the different parts being put together by means of bolts, locks, or lugs, and without the use of solder or other adhesive material, when constructed substantially in the manner and for the purpose herein shown and described.

3d, A warming rack, situated below a warming closet, having its rear side partly or wholly supported by pendant bars, or their equivalent, attached both to the rack and the closet above, for the purpose and substantially in the manner herein shown and described.

4th, The slide, M, or its equivalent, placed in baking ovens or warming closets, and made to be self-supporting, when drawn out of said oven or closet, for the purpose herein described and set forth.

78,891.—HEARTH AND ASH SIFTER IN COOKING STOVES.—Daniel E. Paris, Troy, N. Y.

I claim, 1st, A movable sifting grate or grates, placed permanently within the hearth or ashpit of a stove, and made to vibrate by means of a handle or shaker, operated from the outside of the stove, in combination with the surrounding walls or said hearth, or their equivalent, which act as the sides of a pan, to hold the ashes and coals on said sifting grates as they fall from the fire grate above.

2d, A covered sifting chamber, the sides of which are formed by the hearth or ash pit of the stove, and by the slide or conducting plate below the fire grate, the bottom of which is formed by an open or perforated sifting grate or grates, and the top by a movable cover to said hearth, in combination with an ash pan or ash chamber, situated just below said grate or grates.

3d, A sifting grate or grates thus situated, constructed to dump or discharge its contents into a chamber or movable pan below, and in combination therewith, substantially as here shown and described.

4th, An opening at the lower front of the hearth or ash pit of a stove, of a sufficient capacity to remove the ashes or an ash pan from the chamber below the sifting grate or grates, and in combination with said grate or grates, when the latter are constructed substantially as herein shown, or are placed permanently within the hearth or upper part of the ash pit of a stove.

5th, The closing of said opening at the lower front of the hearth by a drop door or falling plate, having its lower edge or ends attached to the hearth or ash pit, and so constructed that, when it is let down at or near a level with the bottom of said hearth, it will thus remain, for the purpose of supporting, and in combination with, the ash pan, when the latter is made to be drawn out, in the manner and substantially as herein shown and described.

78,892.—CONSTRUCTION OF TOE CALKS FOR HORSE SHOES.—Charles H. Perkins, Providence, R. I.

I claim a toe calkin for horse shoes, furnished with chisel edged tenons or spurs, b b, set opposite to each other, and with their faces parallel with each other and with the longitudinal axis of the caulkin, substantially as described, for the purposes specified.

78,893.—UMBRELLA.—George Willis Pierce, Boston, Mass.

I claim, 1st, The clamp 1, (represented by fig. 2 and 3,) provided with one or more prongs, a a, for the purpose specified, the whole made and operating substantially as described, and for the purpose specified.

2d, The clamp, 5, in combination with the ring, 4, (represented by fig. 4), when made, combined, and operating substantially as described and for the purpose specified.

78,894.—VENTILATING APPARATUS.—William Potts, Handsworth, England.

I claim, 1st, The improved method, herein described, of ventilating rooms and buildings, by constructing and arranging, at the highest convenient part of the room or building, two independent or separate channels, extending at different levels along one or more sides of the room or buildings, and provided throughout their length with ornamental or other perforations, or wire gauze, through which the vitiated air is drawn into the upper channel, and the fresh air passes from the lower channel in the manner specified, whereby the room may be ventilated without creating a perceptible or injurious draft.

2d, The arrangement, in the cornices of rooms or building, of two independent and separate ventilating channels, and the ornamental or other perforations or wire gauze with which the same are provided, for dividing and distributing the air drawn from and discharged into the place to be ventilated in the manner and for the purposes shown and set forth.

78,895.—LUBRICATING DEVICE.—Benjamin H. Reynolds, Canterbury, and John Bachelder, Norwich Conn.

We claim, 1st, The wiper, j.

2d, The arrangement of the pin, e, and groove in the hub of the lubricating wheel, d, to provide for expansion and contraction.

78,896.—APPARATUS FOR CUTTING THE TEETH OF WHEELS. Edward Roberts, Philadelphia, Pa.

I claim the combination of the spindle, collar, and clamping nut, for supporting and clamping the wheel, with the device, consisting of the two cutter disks, stretcher, tightening nut, and adjustable shaft or arbor, all arranged substantially as described.

78,897.—FAUCET.—Alfred Rooker, London, Eng. Patented in England Sept. 25, 1867.

I claim, 1st The annular cutting edge, b, and the hollow part, B, applied to a tap having perforations therein and acting substantially as herein described.

2d, The cutting edge, b, of the hollow part, B, of the stem, which receives the excised plug, in combination with the stop, C, all substantially as and for the purpose herein set forth.

78,898.—BEEHIVE.—S. P. Shipley, Olena, Ohio.

I claim the parts, A and B, constructed with slotted top, combined with each other and with the cap, D, as and for the purpose substantially as set forth.

78,899.—LOCK NUT.—A. D. Smith, Grafton, Ohio.

I claim the mode, herein shown and described, of securing nuts from turning, substantially as and for the purpose set forth.

78,900.—WEATHER STRIP.—J. E. Smith and M. H. Dasenbrook, Warrenville, Ill.

We claim the combination of the strips, D B, spring, S, arranged in a recess, as shown, when said spring is operated by the rod, s, and arm, b, in the manner and for the purposes specified.

78,901.—TEAPOT.—W. W. Stevens, Portland, Me.

I claim the improvement in the construction of pots liable to melt from the influence of heat, consisting of the bottom, as herein shown, and applied as illustrated for the purposes set forth.

78,902.—CLOTHES DRYER.—R. B. Stillman, Almond, N. Y.

I claim the series of swivel hubs or studs, d d d d, hinged slats or bars, b b b b, as constructed and arranged in combination with the frame for holding and folding up the bars, substantially as and for the purposes herein set forth.

78,903.—FASTENING FOR BUTTONS.—Rebecca Weaver, Washington, D. C.

I claim, 1st, The button or stud constructed with heads, e and f, connected together by posts, i i, between which are one or more eyes, substantially as and for the purposes specified.

2d, The clasp, c c, fastening slide or slides, j j, and bodkin, h, arranged and applied for fastening buttons, substantially as and for the purposes herein set forth.

78,904.—HARVESTER.—Thos. Welch, Churchville, N. Y.

I claim, 1st, A vibrating gear and finger-bar frame in harvesters, in combination with a jointed counter shaft, B', for the purpose set forth

2d, With a two wheeled jointed-bar harvesting machine, counter shaft, B', in combination with two frames, one being rigid and the other vibrating, said shaft running across and having journals in each frame, in which it works freely in all variations of either frame, as set forth.

3d, In a two wheeled jointed-bar harvesting machine, a triple gear, mounted upon two shafts, and meshing together, the wheels, H J and N, with their pinions, M I and L, representing said gear, the whole operating in the manner and for the purpose set forth.

78,905.—GUIDE FOR BAND SAW.—Wm. P. Welch, Boston, Mass.

I claim the adjustable guide block, C D, having the elastic guide rollers, L L' and L", arranged in relation to each other and cheeks, A B, all constructed and operating in the manner and for the purpose substantially as described.

78,906.—CONSTRUCTION OF OIL CANS.—H. B. Wellman, Indianapolis, Ind.

I claim the use of water chambers, so combined with an oil can that the oil from said can must pass through the water in its passage to the spout, as and for the purpose set forth.

78,907.—GRAIN CHAFFING MILL.—George Wilcox, Neenah, Wisconsin.

I claim, 1st, The shoe, a, which incases the sieve, and compresses the blast upon the rear part of sieve.

2d, The attaching of the shoe, a, to levers, c c, and holes, f and y, whereby the whole may be raised or lowered at will when attached to the thrashing machine.

3d, The guides to front and rear end of sieve.

4th, The arranging of the conical sieve within the shoe, a, as set forth.

5th, The brace, R, as attached to shoe, a.

6th, The arranging of shaft, 8, with rollers, 2 and 3, and pulley, 1, for propelling the sieve.

7th, The machine herein described, when its several parts are arranged and combined as set forth.

78,908.—CORN HUSKER.—C. O. Yale (assignor to himself and T. W. Mahler), Rome, N. Y.

I claim, 1st, The rolls, C and D, in either form, as described, in combination with the reel, F, or its equivalent, for the purposes mentioned.

2d, The pulleys, C1 D3 D4 and D5, endless cord, D2, and spring, D6, constructed and arranged substantially as described and for the purposes mentioned.

d, The conveyer, H, and arms, H1 and H2, constructed and arranged substantially as described and for the uses and purposes mentioned.

4th, The conveyer, H, and the husking rolls, L and L1, constructed and arranged substantially as described and for the uses and purposes mentioned.

5th, The rings, M M, constructed and arranged substantially as described and for the uses and purposes mentioned.

6th, The plate, K, and the arm, 13, constructed and arranged substantially as described and for the uses and purposes mentioned.

7th, The table, B and F, constructed and arranged substantially as described in combination for the uses and purposes mentioned.

78,909.—MACHINE FOR GRINDING THE CUTTERS OF MOWING MACHINES.—G. P. York and W. H. Wilson, Westfield, N. Y.

We claim, 1st, The combination with a table provided with means for holding a cutter bar, as described, of a grinding wheel, arranged to slide laterally substantially as and for the purpose described.

2d, The combination with the posts, L and L1, of the gages, M1, substantially as and for the purpose described.

3d, The combination with the cutter grinding apparatus of the posts and gages, provided with the facings of wood or other soft material, substantially as and for the purpose described.

4th, The combination with a grinding stone provided with means for effecting a lateral movement thereof, of the guides and posts, substantially as and for the purpose described.

78,910.—MACHINE FOR CARVING WOOD.—H. H. Adams, Newburyport, Mass.

I claim, 1st, The combination with the vertical adjustable frame, j, of the vibrating frames or supports, n, and laterally sliding or adjustable cutter head and its cutters, under the arrangement and for operation as herein shown and specified.

2d, The combination with the frame, j, laterally adjustable cutter head and vibrating truss frames by which the cutter head is supported, of the lever, z, and spring, o', or its equivalent, constructed and arranged to operate substantially as and for the purposes set forth.

78,911.—PACKING FOR PISTON HEADS.—J. U. Adams, Richfield, Mich.

I claim, 1st, The springs E, and rings, D, in combination with piston head B, substantially as described.

2d, The copper, H, or other metal, inserted in the manner described, and for the purposes specified.

78,912.—HAY RAKER AND LOADER.—John Adams, Transfer, Pa.

I claim, 1st, The rake, constructed as described, of the curved teeth, I, attached at their upper ends to the head, H, and the curved bars, J, attached at their outer ends to said head, and adapted to turn freely upon the axle of the roller, B, by being hooked over the same, as herein shown and described.

2d, The adjustable frame, D, carrying the rollers and endless belt of hooks, when recessed at its lower end to rest upon the axle of the roller, B, to which it is held by the tension of the endless belt, G, as herein shown and described.

78,913.—WAGON.—J. F. Applegate, New Albany, Ind.

I claim, 1st, The perch-pole, C, used in combination with the case or sheath of the rear hounds, substantially as and for the purpose set forth.

2d, The body, G, provided with the stops, I and J, and used in combination with the rollers, a a, and the extension perch pole, C, as and for the purpose set forth.

3d, The extended kingbolt, G, in combination with the body, G, and the perch pole, C, as and for the purpose set forth.

78,914.—FASTENING FOR POCKETBOOKS, ETC.—J. C. Arms, Northampton, Mass.

I claim the clasp consisting of the stationary piece, B, and the slide, c, when said parts are constructed and united, substantially as shown and described.

78,915.—MACHINE FOR POLISHING METAL PLATES.—E. C. Atkins, Indianapolis, Ind.

I claim the combination of the stone, Q, running adjustably upon the yoke, R, adjustable plates, S, attached to the latter, and the rollers, M and N, and spring bearings therefor, attached to the plates, S, said parts being arraged in relation to each other, substantially as and for the purpose set forth.

78,916.—DRILL CHUCK.—Eli H. Babcock, Canandaigua, N. Y.

I claim, in combination with the chuck, A, the nut, B, and the reducer, C, substantially as and for the purpose described.

78,917.—HYDRANT.—H. J. Bailey, Pittsburgh, Pa.

I claim, 1st, The construction of the tube, c, valve, b, removable seat, F, and plate, I, arranged to operate in connection with the valve, a, substantially as shown and described.

2d, The hollow valve tube, E, the nut, m, the plate, I, and the valve seat, F, constructed, arranged, and operating substantially as and for the purposes described.

78,918.—PRUNING SHEARS.—Thomas S. Bell, Wapello, Iowa, assignor to himself, G. R. Reed, and J. S Andrews, Louisa county, Iowa.

I claim the blades, A and B, serrated on their beveled sides, and connected at their rear ends, and operated by means of the handles, C and D, and bar, E, substantially as and for the purpose set forth.

78,919.—WOOD-TURNING LATHE.—A. P. C. Bonte, Cincinnati, Ohio.

I claim the adjustable counterpoise, H I, constructed substantially as described, and arranged, relatively to the chuck E F, of an eccentric or elliptical turning lathe, to operate in the manner and for the purpose specified.

78,920.—STUMP EXTRACTOR.—John G. Boyer, Springfield, assignor to Moses Wiant and George Gorr, Lehigh county, Pa. Antedated March 27, 1868.

I claim the portable power, consisting of the mechanism arranged substantially as described, and provided with the chain, j, having movable hooks, l, and the stationary hook, m, all mounted on the frame, A, constructed as set forth.

78,921.—WIND WHEEL.—J. Tobias Braun, Randolph Center Wis

I claim, 1st, The device for connecting the crank, b, of the axle, B, with the cranks, h h, on the spindle of a windmill, said device consisting of the jointed bifurcated rod, J, and angular plate, n, in combination with the jointed rods, J', n, and plate, o, all made and operating substantially as described.

2d, The jointed swivel rod, I, connecting the axle, B, with the spindle of a windmill, in combination with the jointed rod, J J, angular plate, n, plate o, and rods, J' n, all made and operating substantially as herein shown and described.

78,822.—CLAMP OR HUB-BORING MACHINE.—G. Y. Brecht, St. Louis, Mo.

I claim, as a new article of manufacture, a clamp, A, for a hub-boring machine cast or formed with slots for the reception of nuts, and provided with projections, a, and serrated edges, as and for the purpose set forth.

78,923.—ADVERTISING DEVICE.—H. H. Browne, Mt. Vernon, N. Y.

I claim, as a new article of manufacture, the device herein described the same consisting of the business card, b, and the mirror, a, which are retained together by the rim, c, whose periphery is perforated, and the parts thereby form a business card, mirror, and pin cushion, substantially as specified.

78,924.—CUPOLA FURNACE.—Norman Burdick, (assignor to himself, Jacob H. Shear, and Joseph Packard), Albany, N. Y.

I claim 1st, The use of a sliding bottom to a cupola furnace constructed substantially in the manner and for the purpose above described,

2d, The inlaying of such bottom with some non-fusible substance, substantially in the manner and for the purpose above described, in combination with the chamber of a cupola furnace.

3d, The cam-levers, b b, in combination with the bottom, B B, substantially in the manner and for the purpose above described.

4th The form of the pit, in combination with a cupola furnace constructed substantially in the manner and for the purpose above described.

4th The bottom, B B, wheel and axle, D and E, the chain, y y, the truck-wheels, a a a a, the cam-lever, b b, the guides, R R, in combination with the cupola of a melting furnace, substantially in the manner and for the purpose above described.

78,825.—LARD COOLER. Geo. C. Cassard, (assignor to himself and L and J. L. Cassard), Baltimore, Md.

I claim, 1st, The combination and arrangement of the wooden tank, B, having the inclined walls, with the metallic vessel, C, having the upright walls and funnel-shaped bottom, the central discharge pipe, D, and the filling and regulating pipes, G H, when said parts are constructed and arranged in the manner and for the purpose set forth.

2d, The combination of the vessel, C, with the vertical tubular shaft, I, and the hollow arms, I' I', having the outlet holes, a a a, substantially as described.

3d, The combination of the scrapers, r r, springs, s s, and the shaft, I, having arms P P, to support the scrapers and springs, substantially as described.

4th, The combination of the shaft, I the fixed slats, n n, and the movable slats m m, supported by and rotating with the shaft and its arms, and meshing between the fixed slats, when said parts are employed in connection with the vessel, C, and tank, D, having the space, F, between them as described.

78,926.—TIRE SETTER.—Robert Cawthorne, Lyons, Iowa.

I claim 1st, The rests, c c c c, for the purpose specified.

2d, The arrangement and combination of the rests, c c c c, with the tub, A, step, H, standard, E, platform, J, nuts, D and O, when operating substantially as and for the purposes herein set forth and specified.

78,927.—HOISTING APPARATUS.—John Christiansen (assignor to himself and B. Kreischer), New York city.

I claim 1st The combination of the lever, D, carrying the pinions, b b with the shaft, A, gears a a', internal gears, d d', stationary rim, f and drum E', substantially as and for the purpose described.

2d, The combination of the stationary rim, f, supporting the friction rollers, e, with the hoisting drum, E, substantially as and for the purpose set forth.

78,928.—ORE-ROASTING FURNACE.—David C. Collier, Samuel Cushman, and Newell E. Farrell, Central city, Colorado Territory.

We claim 1st, An apparatus for roasting and chlorinizing ores, composed of a cylinder, A, rotating on an axis inclined to the true axis of the cylinder, within which, in the line of the rotating axis is a partial partition for receiving and retaining the ore for a short time at each semi-rotation of the said cylinder, A, in combination with a fire-box, J, and flue, K, substantially as shown and described, and for the purposes set forth.

2d, The wheels, B, in combination with the rotating cylinder, A, substantially as shown and described, and for the purposes set forth

3d, The partial partition, in a plane in the center of the rotation of the cylinder, A and placed at right angles to a line drawn from the man-hole H or I, to said partition, or its equivalent, and in combination therewith, and with any fire-box, J, substantially as shown and described, and for the purposes set forth.

78,929.—SHOOTING GALLERY.—J. S. Conlin, New York city.

I claim 1st, The weighted ball-proof door, M, so arranged between the tunnel, G, and pistol-target, J, that when said door is unfastered, it will swing open to protect the attendant at the target from balls inadvertently discharged, substantially as set forth.

2d, Forming the targets, J and A', with holes through their centers, for the bulls-eye, and with drop-plates or blocks, K and B', which are connected with the front of the gallery by means of cords and bells, substantially as and for the purposes herein shown and described.

3d, Pivoting or hinging the pistol target, J, to the partition, I, so that it may be swung back out of the way, substantially as herein shown and described, and for the purpose set forth.

4th The pistol target, J, when connected to the front of the gallery, by means of a cord, 7, so that it may be swung to its place from the said front of the gallery, substantially as set forth

5th. The arrangement in front of the rifle target, A', of the partition, R, formed with an opening, S, and provided with a sliding ball-proof plate, T, which latter is so connected, by means of a cord, V, to the door, U, that when said door is opened the opening, S, is covered by the plate, T, to protect the attendant substantially as described.

6th The combination of the weighted door U, and sliding ball-proof plate, T, with each other and with the partition, R and the rifle-target, A' substantially as herein shown and described, and for the purpose set forth.

7th, The combination of the plate or block E', having three or more arms projecting from it, shaft, D', ratchet wheel, F', weight, I', and stop arm, K', with each other, with the drop-plate or block, B', and target, A', substantially as herein shown and described, and for the purpose set forth

8th, The combination of the adjustable rest Q', shaft, T', ratchet wheel, W', pawl, V', and rod, X', with each other and with the forward part of the gallery, substantially as herein shown and described, and for the purpose set forth

9th, An improved shooting gallery, constructed and arranged substantially as herein shown and described, and for the purpose set forth.

78,930.—LITHOGRAPHIC PRESS.—Geo. Cooper (assignor to V. E. Mauger) New York city

I claim 1st, Wetting a lithographic stone by moistening the surface of another stone, and transferring the moisture from the same to the printing stone as described.

2d, Wetting a lithographic stone by means of a moist roller or rollers, F, and wipers, H H G, under and between which the stone passes, substantially as described.

3d, The water-containing vessel, A, when provided with an adjustable slot that is filled with absorbing material or fabric, B, substantially as herein shown and described.

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4th, The up and down adjustable elastic plate, I, when arranged as set forth, for the purpose of equally distributing the moisture over the slab, E, in the manner specified.

5th, Securing the wipers, H H, to adjustable bars or springs, d d, for the purpose of adapting the machine to stones of greater or less width and thickness as specified.

6th The combination of the slotted vessel, A, cloth, B, screws, or their equivalents, a, carriage, C, stones, E, wipers, F G and H, and distributer, I, with each other and with the stone, D, all made and operating substantially as and for the purpose herein shown and described.

78,931.—Pencil Sheath.—John Danner, Canton, Ohio.

I claim a pencil-case or socket, with rubber or other flexible or elastic lining, c, contained in an enlarged chamber, b, in the inside thereof, which rubber will by its friction, hold a pencil inserted therein, and protect its point, and be itself held in the chamber by the recessed shoulders thereof substantially as described.

78,932.—Preserving Meat etc.—William Davis, Detroit, Mich.

I claim 1st, The construction of a car body room box, or chest, provided with compartments, A B C, ice receptacle, D, chimneys, or funnels, E and hatches, G, when arranged and operating substantially as described, and for the purposes set forth.

2d, The goose-neck trap, F, or equivalent, in combination with the receptacle, D, and compartments, A B C, when arranged substantially as and for the purposes set forth.

78,933.—Piston Valve for Steam Hammer.—David Davy, Sheffield, Great Britain.

I claim the hollow piston valve, provided at the top and bottom with the valves, e e, between which the annular space, b, is formed, arranged to operate in relation with the ports, d g, in the cylinder, the induction port, a, and exhaust, H, as herein described for the purpose specified.

78,934.—Gage-Wheel for Plows.—Gaius S. Deane, Great Rapids, Mich.

I claim 1st The combination of a false hub, E, with the hub of a cast-iron plow wheel, substantially as herein shown and described, and for the purpose set forth.

2d, The hollow axle, C, secured to the standard, A, by a bolt, D, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the recessed standard, A, bolt, D hollow axle, C, cap, F, removable false hub, E, and cast-iron wheel, B, with each other, said parts being constructed and arranged substantially as herein shown and described and for the purposes set forth.

78,935.—Ventilating and Drying Corn and Grain.—D. A. Dickinson, Baltimore, Md.

I claim ventilating and drying corn and grain by means of the inverted V-shaped covers and holes in the siding or walls, as herein recited.

78,936.—Tail-Clasp for Milkers.—H. H. Dickinson, West Northfield, Mass.

I claim a tail clasp for milkers' use when constructed and operating substantially as herein described and for the purposes specified.

78,937.—Wash-Bench.—Franz Diebold, Boston, Mass.

I claim the combination and arrangement of the bars, A B and C, with the pins D, and the necessary legs, for the purposes specified.

78,938.—Machine for Making Bungs for Casks.—Wm. Donaldson, Cincinnati, Ohio. Antedated January 3, 1868.

I claim 1st, The combination of the cam R', pivoted guide-plate, S', pin f', block, F', claws, G', spring, H', pawls or claws, I', spring, J', and cylindrical clutch, C', with each other substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the center, M' and adjustable slotted plate, N, with each other and with the cylinurical clutch, C', as herein shown and described for the purpose specified.

78,939.—Sleigh.—John P. Dorman, Galesburg, Ill.

I claim the construction and arrangement of a sleigh or sled of malleable iron and zinc, substantially in the manner and for the purpose as herein set forth.

78,940.—Washing Machine.—Wm. M. Doty, New York city, assignor to himself, Ezra P. Doty, and Ellis Doty, Janesville, Wis

I claim 1st, The mode of connecting the legs with the suds-box, by fitting the upper L-shaped parts of the legs around the flanges projecting from the box, and by connecting and holding together the same by means of ties or rods, substantially as herein shown and described.

2d, The combination with a suitable concave or rubbing board of a swinging oscillating wash-board, formed in two parts, hung independently of each other upon the same axis, the one being rigidly connected to the said axis or shaft, and the other loosely mounted thereon, substantially in the manner and for the purposes set forth.

3d, The oscillating and divided wash-board, composed of two parts or jaws as herein described in combination with a device for clamping and holding together said parts, substantially as and for the purposes herein shown and specified.

4th, The combination with the jaws of the divided wash-board, of the eccentric clamping roll, D, and the arms or links by which the same is held to the wash-board, substantially as herein shown and set forth.

5th, The combination with the divided wash-board and its clamping device of the shaft, C, and pendent arms, by which the said board is connected with the shaft, substantially as herein shown and set forth.

6th, The oscillating and divided wash-board, and its clamping-device, in combination with the movable stop, m, arranged and operating as herein shown and set forth.

7th, The plates, h and i, in combination with the slotted end board, b, of the suds box, all made and operating substantially as described, so as to form a closed up-and-down movable bearing for the shaft, C.

8th, The combination with the jaws of the divided wash board, of a beating frame G, all arranged in one swinging frame, as described.

9th, The beater frame, when hinged or made movable within the swinging frame, substantially as and for the purpose herein shown and described.

10th, The manner of arranging the slats in the beater or presser frame so that the turning of garments is promoted, as set forth.

11th, The beater frame when arranged as described, in combination with the boards, g and n, and slat frame, I, under the arrangement and for operation substantially as herein shown and described.

12th, The combination with the shaft for operating the wash board, of a handle or lever mounted upon said shaft, substantially in the manner described, so that it may be set or adjusted to various hights.

13th, The toothed disk, J, in combination with the lever, F, and shaft, C, the whole being arranged for operation substantially as herein shown and described and for the purpose specified.

14th, The valve, M, when arranged as described, and when provided with a stop, p, working on an inclined plane, in combination with suds box, substantially as and for the purposes herein shown and described.

15th, In a washing machine in which the suds box is divided into two compartments as described, the combination with the larger compartment, containing the clothes washing apparatus, of the smaller compartment and the tube or conduit therein for admitting water from the exterior into the said box, substantially in the manner and for the purposes herein shown and specified.

16th, The combination with the divided suds box and the tube or conduit, o, of the trough, H, under the arrangement and for operation as herein shown and set forth.

78,941.—Loom.—Wm. F. Draper, Hopedale, Mass.

I claim the arrangement and combination of the arm, J, and its shoulder, l, or the equivalent of the latter, with the arm, H, and its actuating mechanism, the slide rod, d, and its actuating mechanism (inclusive of the vibratory whip roller or any equivalent therefor placed over the yarn beam), and the lever, n, and other mechanism for setting back the impelling pawl, n, of the ratchet, o, the whole being substantially as explained.

Also the combination of the spring catch, f', or its equivalent, with the stop motion and the mechanism for actuating the retaining pawl of the cloth beam ratchet.

Also the combination of the slider, N, or its equivalent, with the stop motion and the spring catch f', applied to the slider f, thereof, as and for the purpose specified.

78,942.—Meat Mincer.—Jean M. Drouyer, Carondelet, Mo.

I claim, 1st, The combination of the cutters, m, drivers, r, shafts, i i', cylinders, b b' b'', all constructed and arranged substantially in the manner and for the purpose set forth.

2d, The piston, T, spring, T'', and cam, V, constructed, arranged, and operating together substantially as specified.

3d, The combination of the different parts herein specified, arranged substantially as described and for the purpose set forth.

78,943.—Coffee Pot.—Jonathan G. Dyer, Chicago, Ill.

I claim, 1st, in a coffee or tea pot, the combination of the imperforate division plate, b, the vessel or receptacle, B, with the handle, c, and the supporting and guiding wires, all constructed and arranged substantially as shown and described.

2d, The valve, d, in combination with the division plate, b, as and for the purpose set forth.

78,944.—Shuttle for Sewing Machines.—Nelson B. Eveland, Hartford, Conn.

I claim the slot in the shuttle, formed as described, with a long portion, C, and an abruptly curved end, d, and for the purpose set forth.

78,945.—Truss.—Matthew Faloon, Bloomington, Ill.

I claim, 1st, The divided pad, A, working by means of one or more spiral or elliptic springs, substantially as and for the purposes herein set forth.

2d, The combination of movable adjusting bar, D, with wheel, d, and spring, f, arranged and operating substantially as and for the purposes herein set forth.

3d, The movable head, e, arranged and operating substantially as and for the purposes herein set forth.

78,946.—Abdominal Supporter.—Matthew Faloon, M. D., Bloomington, Ill.

I claim, 1st the arrangement of two pads, B, made of any suitable material, and arranged in front on a supporter, substantially as and for the purposes herein set forth.

2d, The springs, a, and wheel, b, forming the adjusting attachment, C, arranged and operating substantially as and for the purposes herein set forth.

78,947.—Awl Haft.—L. H. Farnsworth, Hudson, Mass.

I claim the jaws, A A, as made with the conical and screwed shanks, and the socket head, B, as made with a conical mouth and a screw arranged therein to receive the screwed shanks or the jaws, the whole being substantially as and to operate as specified.

Also the combination of the screw, C, with the head, B, and the series of disks, D D', of leather or other proper material, screwed on such screw, as described.

Also the arrangement of the connection rivet or pin, b, viz., within the conical shanks, and transversely through their screw, and with respect to the jaws, A A, as represented.

78,948.—Musketo Bar for Windows.—Andrew C. Flint, Boston, Mass.

I claim a musketo bar made with rigid clamping uprights and elastic bands, and with netting clamped by the uprights and stitched to the bands, substantially as and for the purpose described.

Also the combination of the two elastic bands, b and m, with the uprights, when the bands are arranged in planes at angles to each other, substantially as and for the purpose specified.

Also the projecting arrangement of the lower band, c, with reference to the lower ends of the uprights, for the purpose specified,

Also the wires, i, in combination with the elastic bands and sockets in the uprights, substantially as and for the purpose specified.

78,949.—Ash Sifter.—Charles Folsom, New York city.

I claim, 1st, The sifting box, B, having a wire gauze bottom, F, semicircular flanges, E, and flanged opening, C, over which the pail, d, is fitted, said box, B, being abapted to fit over the box, A, as herein shown and described.

2d, The combination and arrangement of the sifting box, B, having open bottom, F, flanges, E, and flanged opening, C, the pail, d, provided with a rounded bottom, and the pin, A, all constructed to operate in the manner and for the purpose herein shown and described.

78,950.—Musketo Killer.—H. D. Forbes, Cambridge, Mass.

I claim a musketo killer having a head block, F, flexible joint, D, and handle, C, substantially as described and for the purpose set forth.

78,951.—Gas Heater.—Oscar C. Fox, Georgetown, D. C.

I claim, 1st, A petroleum stove having the detachable pipe L, burner B, cup C, and cylinder E, the upper edges of which are notched, all constructed and arranged substantially as shown and described.

2d, A stove having two or more compartments provided with independent burners, and having an adjustable slide, for separating said compartments whereby either may be heated and used independently of the other, when constructed and arranged substantially as herein set forth.

78,952.—Pisciculture.—Wm. H. Furman, Maspeth, N. Y.

I claim, 1st, the method substantially as herein described of breeding fish by means of a structure composed of a spawning chamber or receptacle and receiver for the young fish, with the water introduced thereto in an upwardly direction, through the gravelly bed or bottom, to the spawning chamber of the structure, and caused to flow or pass through the receiver, essentially as herein set forth.

2d, The brook shanty or structure, A, composed of a spawning chamber, C, and receiver, D, with flood gates, B E, and guard, F, or their equivalents, and having the water introduced through the gravelly bed or bottom to the spawning chamber, to establish a stream or current through the structure, substantially as specified.

78,953.—Priming Metallic Cartridges.—Richard J. Gatling, Indianapolis, Ind.

I claim the struck-up metallic cup, B, fitted within the shell, A, without contact with the flanges of the latter, and recessed to form the anvil, a, and to receive the cup, C, fitting in close contact with the sides of said recess, for the purpose of preventing the escape of gas between the shell, A, and cup, B, as herein shown and described.

78,954.—Tool for Turning Cylinder Rings for Cotton Gins.—John Gibbons, West Troy, N. Y.

I claim the chuck, A, with its projecting face, a a, and arbor, k, and recess for gage rings, in combination with gage rings, E, and with the cutter head, B, its cutter, C, ring, e, its recess, supporting rings, n, and spiral springs, f f, and rings, g and t, substantially as described and for the purposes set forth.

78,955.—Butter Tub.—D. A. Gilbert, Morristown, Vt.

I claim the hooks C C, upon the tub, when used in combination with the cover, provided with slots D D, and the inclined surfaces from a to a, as and for the purpose set forth.

78,956.—Spring Bed Bottom.—Lewis Granger, Memphis, Mich.

I claim the combination and arrangement of the slats D and E, and blocks F, with the transverse bar C, in connection with any proper bedstead, and operating substantially as described and for the purposes set forth.

78,957.—Horse Power.—J. A. Green, North Waterford, Me.

I claim, 1st, The removable, portable and collapsible wheel composed of the arms c, set in blocks b, on the post B, having ring e, and arms, d, all as and for the purposes set forth.

2d, The combination of the said wheel, composed of the arms c, with the shaft, k, wheel o, and saw shaft, p, by means of cords or bands f and v, as herein set forth.

3d, The adjustable pulleys or friction rolls j and u, as and for the described purposes.

4th, The combination in the manner herein set forth, of the different parts described, in the manner and for the purpose of constituting a portable horse power sawing machine, capable of being taken apart and put together, as set forth.

78,958.—Construction of Drilling Jars.—Edward Guillod (assignor to Bryan, Dillingham & Co.), Titusville, Pa.

I claim the within described drilling jars, constructed of wrought iron and steel, combined and applied substantially in the manner and for the purposes set forth.

78,959.—Machine for Rounding Slate Frames.—Stinson Hagaman, Weissport, Pa.

I claim the bolts or centers O O, and lever F, in combination with the rocking tree, H, connecting rod, I, and lever, J, all operating substantially as described and for the purpose specified.

78,960.—Cross Bar Lock for Doors, etc.—Jas. E. Hanger, Staunton, assignor to himself and J. E. A. Gibbs, Rockbridge county, Va.

I claim, 1st, The combination of the curved rack H, constructed substantially as herein shown and described, with the cross bar E, and pinion wheel I, as and for the purpose set forth.

2d, Giving to the cross bar E a longitudinal and swinging movement by means of the pin M, projecting from the cross bar, and working in the curved slot N of the case F, fastened substantially as herein shown and described and for the purpose set forth.

78,961.—Friction Clutch Pulley.—David Harrington (assignor to himself and J. S. Wheeler & Co.), Worcester, Mass.

I claim, 1st, The combination with the rim D of the pulley, hub F, and arms GG, of the screw shafts K K, and friction pads J J, substantially as and for the purposes set forth.

2d, The combination with the screw shafts K K, and hub M, of the crank arms I I, and connections N N, substantially as and for the purposes set forth.

3d, The combination with the hub M, of the projections g g, substantially as shown and described.

4th, The combination and relative arrangement with the loose pulley A and shaft E, of the hub F, arms G G, with projections H H, and steady pins a a, and screw shafts K K, substantially as and for the purposes set forth.

78,962.—Door Lock.—R. C. Harrington, Newark, N. J.

I claim the cam, G, sliding plate, H, and lug, g, in combination with the bolt, D, tumbler, E, and the partition, c, all made and operating substantially as and for the purpose herein shown and described.

78,963.—Butter Tub.—Aaron B. Harris, Morrisville, assignor to himself, H. D. Bryant and H. H. Gates, Lamoille county, Vt.

I claim the metal spring hooks, a a, in combination with the flanged ratchet-plates, b b, for the purpose of fastening the cover to the tub, substantially as and for the purposes herein set forth.

78,964.—Warping Chuck.—Joseph T. Haskins (assignor to himself and E. Rowe), Rockport, Mass.

I claim the friction rollers, A, when inserted in the chuck by being passed through the bottom, and secured in place by the plate, C, in combination with the recesses in the jaws of the chuck, and in the plate, C, as herein shown and described.

78,965.—Fanning Attachment for Rocking Chairs.—Augustus R. Hobbs, Elizabeth, N. J.

I claim, 1st, The grooved rod, B, in combination with the shaft, D, and and fans, G, substantially as shown and described and for the purposes set forth.

2d, The tube A, and grooved rod, B, or its equivalent, and spring, I, by means of which a reciprocating rectilinear motion of the rod, B, is changed to a reciprocating rotary motion of the shaft, D, and any fans, G, in combination with any rocking chair, M, substantially as shown and described.

3d, The device for holding the shaft, D, in proper position with respect to the rod, B, substantially as shown and described.

4th, The collar, K, in combination with the tube, A, made in two parts, for adjusting the position of the fans, G, substantially as shown and described.

5th, A fanning attachment to rocking chairs, substantially as shown and described.

78,966.—Construction of Prisons.—Isaac Hodgson, Indianapolis, Ind

I claim, 1st, The hollow door posts, M, furnished with the hooded shutters, R, the cordways, L, and vertical tube or U-iron, a, substantially as set forth.

2d, The hasp, N, and eye, g, bolt, o, and cords, e, and stops, r and i, constructed and arranged substantially as and for the purpose set forth.

78,967.—Perpetual Register.—Joel S. Hood and John H. Hood, Washington, D. C. Antedated June 6, 1868.

We claim, 1st The slides, m, constructed with rearwardly projecting spurs, s, at one end, and knobs, n, on the front side of their opposite ends, arranged in combination with the slotted plates or cards, A B, for operation together, as shown, and for the purposes described.

2d, The disks, D, in combination with the slotted plates, A B, and slides, m, all arranged substantially as and for the purpose specified.

78,968.—Drawing and Twisting Head for Spinning.—Ambrose L. Houghtaling (assignor to Geo. W. Philip), Philmont, N. Y.

I claim, 1st, The combination of the independently adjustable drawing rollers, m m, having straight parallel sides, with the twisting tube, c to the axis of which they are always maintained in central relation, as and for the purposes herein described.

2d, The combination of the drawing rollers, m m, having straight parallel sides and adjustable independently on opposite sides of the axial line of the twisting tube, c, with the positive gears, k k, and the tube, substantially as and for the purpose described.

3d, The pair of adjustable sliding bearings, s s connected by the springs, t t, respectively, and fitted in the opposite recesses, p p, in the box, n n, in combination with the drawing rollers, m m, having straight parallel sides, all constructed and operating substantially as and for the purposes described.

4th, The combination of the adjustable take up rollers, b b1 b2, or their equivalents, with the adjustable drawing rollers, m m, and the twisting tube, c, arranged and operating in connection therewith, substantially as and for the purpose specified.

78,969.—Horse Rake.—Jonathan Hunsberger, Worcester Township, Pa.

I claim 1st, Operating the rake teeth to discharge the collected hay, by means of a toothed rack and cog wheel connected with the axle of the machine, substantially as herein shown and described.

2d, The combination of the foot lever, L, toothed rack, G, cog wheel, D, sliding spring clutches, E, and levers, H and N, with each other and with the axle, A, frame C, and pivoted bar, R, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the arms, K and blocks, J, with flanges, g', formed upon the side edges of the toothed rack, G, substantially as herein shown and described, and for the purpose set forth.

78,970.—Soles for Boots, etc.—John M. Hunter, Morristown, N. J.

I claim, 1st, The sheet metal outer sole, A A* B, constructed with spurs or lips, a b, around its edge, for attachment to the boot or shoe, in the manner substantially as shown and described.

2d, The combination of the sheet metal sole, A B, constructed as described, the cork tread and heel filling, f D, and leather strips, E C*, with the welt of the boot or shoe, all arranged substantially as shown and specified.

78,971.—Steam Bath.—Louis Heine, Philadelphia, Pa. Antedated June 13, 1868.

I claim the frame or bedstead, A A, in combination with the gauze bottoms C and D, cylinder B, and cover, E, constructed substantially as described, operating as and for the purposes set forth.

78,972.—Time Piece.—Charles King, New York city.

I claim the balance weight, c, attached either to the arbor of the minute hand or to that of the hour hand of a watch movement, A, and operating in combination with said movement and with the index, C, substantially in the manner and for the purpose set forth.

78,973.—Mash Tub.—Leopold Klee (assignor to himself and Charles T. Herrosee), Pittsburg, Pa.

I claim, 1st, The combination of the tub, A, with the tub, B when constructed and arranged substantially as and for the purpose described.

2d, The combination with the tubs, A and B, of a cover, when arranged to hermetically close the opening to both tubs, substantially as and for the purpose described.

3d, The combination with the tubs, A and B, of the heating pipe, E, when arranged substantially as and for the purpose described.

4th, The combination with the hermetically closed mash tub, substantially as herein described, of a means for compressing the air therein, as and for the purpose described.

5th, The combination with the mash tubs, A and B, of a hinged cover, D, when arranged to be hermetically secured to the tubs, substantially as and for the purpose described.

6th, The combination with the mash tubs, A and B, of the cover, when arranged to hermetically close the same, as shown in fig, 3, substantially as and for the purpose described.

7th, The combination with the tubs, A and B, of the man-hole appliances, F, pipes, G and H, when all constructed and arranged substantially as and for the purpose described.

78,974.—Combination Tool for Measuring and Marking.—C. M. Lane (assignor to himself and Charles Gooch), Cincinnati, Ohio.

I claim the combination of the graduated and pointed legs, B having curved arms, E, right-angular arm, F, and graduated arc, G, said legs, B, being pivoted together by a thumb screw, C, substantially as described for the purpose specified.

78,975.—Washing and Wringing Machine.—Moses Leavitt and Azariah Foster, Ottawa, Ill.

We claim, 1st, The smooth roller, f, in combination with the bucket roller, g, the arms, d d, the springs, j j, and the springs, k k, substantially as described.

2d, The hinged slats, n n n, and the springs, q, in combination with the elastic board, F, substantially as and for the purpose described in the foregoing specification.

78,976.—Bottle Lock.—Leander Lehman, Harrisburg, Pa.

I claim, 1st, A self-locking bottle stopper, when the cover is secured by means of a spring lock and hasp, substantially as described.

2d, Securing the same to the bottle by means of the band, a, the ends of which are fastened together by the protected screw bolt, g, in the manner described.

78,977.—Die for Forging Eye-bolts.—Franklin Leonard, Cleveland, Ohio.

I claim the dies, B C, when constructed and arranged to operate in the manner as and for the purpose specified.

78,978.—Lamp Burner.—H. M. Wyatt, Somerville, Mass.

I claim the chimney and air deflector elastic supporters, D D, made substantially as described and represented, that is, with the operative bends and the deflector rests arranged and formed in manner as represented and described.

78,979.—Portable Fence.—John Leonard, Basil, Ohio.

I claim, 1st, Securing the panels, A and B, to each other, and in an erect position, by the inclined braces, C and G, short notched posts or stakes, E, and wedges, F and D, substantially in the manner herein shown and described and for the purpose set forth.

2d, Strengthening the panels, A and B, in position, by the inclined braces, H, short notched posts or stakes, I, and wedges, J, substantially as herein shown and described for the purpose set forth.

78,980.—Weather Strip.—J. E. Lindsley, Goshen, Ind.

I claim the metal plate, E, applied to the outer portion or tread, D, of the sill, in combination with the metal strip or cap, F, and lever, G, all arranged substantially as and for the purpose set forth.

78,981.—Combined Press and Strainer.—Joseph H. Littlefield, Cambridge, Mass.

I claim the metal frame, A, with grates, a a, and feet, B B, in combination with the strainer, O, and bottomless case, C, with standard, D, lever, E, bar, G, and follower, F, the several parts being constructed, arranged and used substantially in the manner specified.

78,982.—Artificial Fuel.—Emile Louiseau and Charles F. Reguin, Nashville, Tenn.

We claim a composition for fuel, consisting of the ingredients herein shown and described.

78,983.—Machine for Bending Wood.—James G. Lucas, Newark, N. J., assignor to himself and Aretus L. Sawin. Antedated June 4, 1868.

I claim, 1st, The longitudinally recessed former, in combination with the presser die, constructed to operate substantially as and for the purpose specified.

2d, The side presser stays, in combination with the former, constructed to operate substantially as and for the purpose specified.

78,984.—Axle Roller.—W. S. Mackintosh, Pittsburg, Pa.

I claim the roller, D, having grooves thereon, constructed and arranged substantially as shown and described and for the purposes set forth.

78,985.—Machine for Making Cigars and Cigarettes.—Joseph Marengo and Alexander Marengo, Burlington, Vt.

We claim a machine for manufacturing cigars and cigarettes, constructed and operating substantially as shown and described, that is to say, with the roughened rollers, f f, the sands, D D, and the arms, E E, the sliding frame, H, with the roller, K, with their bells and connections, when arranged substantially as and for the purposes set forth.

78,986.—Invalid Bedstead.—John Young, Jr., Sunapee, N. H., administrator of the estate of Dellavan D. Marsh, deceased.

I claim, 1st, The combination of the resting bars, g g' g'', sockets, d d', etc., the supporting lever, D, the supporting arms, E E' E'', the pulleys, F F1, the pulley frame, I, the pulleys, G G' G'', and circular revolving plate, F2, the bed plate, B, the king bolt, C, the supporting bars, A A', the bed pieces, U U', the cords, Z Z', the ratchet wheels, K K' K'', and cranks, L L' L'', the cords J J', etc., and the axles, a a', and crank, R, combined, arranged, and operating substantially as and for the purposes above described.

2d, The combination of the resting bars, g g' g'', and sockets, d d', the supporting lever, D, the supporting arms, E E' E'', and the pulleys, F F1, the pulley frame, I, and pulleys, G G' G'', the circular revolving plate, F2, the bed plate, B, the king bolt, C, the supporting bars, A A', the bed pieces, U U', the cords, Z Z', the ratchet wheels, K K' K'', and cranks, L L' L'', arranged and operating substantially as above described.

3d, The combination of the resting bars, g g' g'', and sockets, d d', the supporting lever D, the supporting arms, E E' E'', the pulleys, F F1, the pulley frame, I, and pulley, G, the circular revolving plate, F2, the bed plate, B, the king bolt, C, the supporting bars, A A', the bed pieces, U U', the cords, J J', the axles, a a', and crank, R, arranged and operating substantially as above described.

78,987.—Nursing Bottle.—Patrick J. McElroy, East Cambridge, Mass.

I claim the milk receiving and delivering bottle, a, when combined with a breast-nipple tube, d, and having an outlet, c, flexible pipe, g, mouth and nipple-attaching tube, h, and artificial nipple, i, all arranged to operate substantially as described.

78,988.—Ladder.—Albert C. McKendree, Conneaut, Ohio.

I claim the shaft, O, roller, o1, and slotted bar, o2, when combined and arranged with the ladder, A', as and for the purpose set forth.

78,989.—Quilting Frame.—P. H. Mellon, St. Louis, Mo.

I claim securing the rollers, E, in the ends of the bars, B, by means of the slotted metallic plates, D, and slotted sliding plates, F, as herein shown and described.

78,990.—Railroad Car Heater.—Albert C. Miner, Philadelphia, Pa., assignor to himself and James Guild, Washington, D. C.

I claim the steam box, E', having its upper face, corrugated and forming the floor of the car, E, in combination with the pipes, B B1 B2, and valves, C C', when constructed and operating as herein represented and described.

78,991.—Felting Machine.—Charles Mossant, Bourg Du Péage, France.

I claim, 1st, The hollow bed, a', in combination with the reciprocating platen, having vertically sliding plates, i, and the endless chains, x, bearing the cone rollers, f, substantially as described for the purpose specified.

2d, The felting plates, h, having attached thereto by springs, k, the laterally yielding felting strips, j, substantially as shown and described and for the purpose specified.

3d, The roller carrying chains constructed as described, with open links for the purpose of providing bearings for the cone rollers, substantially as herein set forth.

4th, Imparting a to-and-fro travel to the rubbing platen, the cone rollers, , and hollow chains, x, with a proportionately small excess of forward progression of the roller chains by means of the eccentrics, P Q K, and their connecting rods, the crank shaft, l', and connecting rods, M, the friction lever and the pawl lever, o, pawl, v, and ratchet wheel, N, all combined and arranged to operate in the manner herein shown and described.

78,992.—Hanger for Shafting.—Gerrit V. Orton, Cincinnati, Ohio.

I claim, 1st, The convex projection, a, in combination with the bolt, c, for retaining the box in its seat, substantially as described.

2d, The threaded stem, b, when arranged to adjust the box by its own rotation, as herein set forth and described.

3d, The screw bolt, c, for retaining the box in its seat, in the manner and for the purposes specified.

4th, The combination and arrangement of the convex extension, a, revolving screw stem, b, and screw bolt, c, arranged and operated substantially as set forth and specified.

78,993.—Bottom for Boiler.—George T. Palmer, Brooklyn, N. Y. Antedated June 6, 1868.

I claim a perforated plate, a b, with a depressed rim and handle, c, made substantially in the manner shown and for the purpose set forth.

78,994.—Railroad Car Jack.—Elias C. Patterson, Rochester, N. Y.

I claim the jointed brace, B and C, operated by lever, A, substantially as described.

78,995.—Machine for Sharpening Saws.—Benj. P. Pendexter, Minot, assignor to himself and George W. Horner, Mechanics' Falls, Me.

I claim, 1st, The annular file, a, secured to the flanged wheel, A, upon the arbor, C, by means of the flanged washers, H, as herein described for the purpose specified.

2d, The anvil, e, of the saw set, formed upon and with the journal box of the arbor, C, as herein shown and described.

3d, In combination with the anvil, e, formed with the journal box, the pivoted hammer arm, S, operated by the toe, a2, and spring, S2, as herein described for the purpose specified.

78,996.—Safety Hook.—L. H. Pfleegor, Milton, Pa.

I claimed the combined construction and arrangement of the stock, A

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hook, B, and lock lever, C, substantially as and for the purpose herein specified.

76,997.—CORN MARKER.—W. E. Phelps, Elmwood, Ill.

I claim the frame, A, provided with the two wheels, C C, one at each end, in combination with the bar, D, connected to the rear of the frame, A, by a joint, e, and provided with a wheel, E, all constructed and arranged substantially in the manner and for the purposes set forth.

78,998.—COMBINED HARROW, DRILL, PLANTER AND ROLLER.

David B. Platt, Madison, Ind.

I claim, 1st, The combination of the rollers, I, with the removable seed box, C, drill shaft, E, wheels, F, adjustable plows, B, and frame, A, constructed, arranged and operating substantially as described.

2d, The combination of the removable seed box, S, shaft, T, planting rollers U, pinion, W, toothed rack, S, and lever, Y, with the adjustable plows, B, and frame, A, all constructed, arranged, and operating substantially as set forth.

3d The combination of the pivoted tongue, L, bar, M, connecting rod, N, pivoted lever, O, perforated standards, P R, and frame, A, substantially as described and for the purpose specified.

4th, The combination of the slides, G, plates, H, removable seed box, C, roller, E, and wheels, F, substantially as described.

5th, The frame, K, when its front and rear cross bars, K1 K3, are provided with teeth, in combination with the removable toothed cross bar, K2, substantially as set forth.

78,999.—SCRAPER.—Frederick Post, Plano, Ill.

I claim the combination of the scraper, A, chains, E, rollers, M, ratchet wheel, H, ratchet, I, spur wheel, F, pinion, G, and crank, D, all constructed substantially as described and operating as specified.

79,000.—DEVICE FOR FITTING WRIST PINS.—George Raft, Erie, Pa.

I claim the improved device herein described for boring out the eyes for wrist pins.

79,001.—CULTIVATOR.—Samuel Reed, Rising Sun, Md.

I claim, 1st, The combination of the forked draft bar, I, curved notched bar, J, and sliding catch, K, and their substantial equivalents, with each other and with the frame, A, of the cultivator, substantially as herein shown and described and for the purpose set forth.

2d, The pointed or rubber teeth, C, removably attached to the pivoted shanks, D, for the purpose of pivoting the said teeth to the frame, A, substantially as herein shown and described.

3d, The combination of the long lever, F short slotted levers, E, pivoted shanks, D, and pointed or rudder teeth, C with each other and with the cultivator frame, A, substantially as herein shown and described and for the purpose set forth.

4th, The combination of the lever catch, G, with the long lever, F, and with the curved and notched rack, H, attached to the cultivator frame, A, substantially as herein shown and described and for the purpose set forth.

79,002.—CHURN.—Christian C. Reese, Attica, Ind

I claim, 1st, A churn dasher consisting of the vertical shaft, F, radial arms, G H, dashers, G H, dashers, I i J j, and gatherers, K L, the whole being arranged and operating substantially as herein described and set forth.

2d, In combination with the elements, F G H I i J j K and L, of the preceding clause, the pinion, D, spur wheel, E, and winches, e e', for the purpose specified.

79,003.—ESCAPEMENT FOR CLOCK.—Christian Reinhart, New Haven, Conn.

I claim, 1st The double-tooth crown wheel, A, as constructed, in combination with the verge collet, B and stop collet, E, operating substantially as and for the purposes herein specified.

2d, The verge collet, B, stop plate, E, as constructed and arranged, in combination with the forked lever, D, pin, h, arm, k, and balance wheel, H, as set forth.

3d, The forked lever, D, with its open space, m, stop pin or stud, n, when the lever is balanced on the verge shaft, C, so as to distance the motion of the collet, B, and stop plate, E, to allow the points, a a, to escape through the incline openings, e e, and opening, f, as herein described.

79,004.—DIE FOR CUTTING SPOON BLANKS.—F. A. Rich and H. W. Bassett, (assignors to Hall, Elton & Co.,) Wallingford, Conn.

We claim the arrangement of the cutter, G, on the one part, and the corresponding edge, a, on the other part, and combined with the die, C, and punch E, and in such relative position thereto that the whole will operate in the manner substantially as set forth.

79,005.—WAGON BOLSTER.—George Richards, Richland Center, Wis.

I claim the combination, with the bolster A, of the cap B, spring d, and jug C, substantially as and for the purpose described.

79,006.—MACHINE FOR PLANING MOLDINGS.—E. H. Ripley, North Chelmsford, Mass.

I claim, 1st, Pivoting or hinging the feed box J', to the plate F', attached to the upper end of the vertical shaft D' substantially as herein shown and described and for the purpose set forth.

2d, The eccentric plate or frame V constructed substantially as herein shown and described, in combination with the vertical shaft D', as and for the purpose set forth.

3d, The combination of the adjustable connecting rod U, and weighted or balanced lever, Q, with the cam O, and pivoted eccentric plate or frame, V, substantially as herein shown and described and for the purpose set forth.

4th, The combination and arrangement of the slotted lever R, centrally pivoted to the vertically adjustable support X Y, and rod Z and step A', with relation to the cam P, and vertical shaft D all constructed and arranged to operate in the manner and for the purpose substantially as herein shown and described.

5th, The combination of the adjustable arm V', and slotted rigid arm U', with the vertical shaft D', and pivoted collar E', through which said shaft passes, substantially as herein shown and described, and for the purpose set forth.

79,007.—CORN SHELLER.—Wm. Roberts (assignor to himself Austin Roberts and Welcome Sprague,) Farnham, N. Y.

I claim supporting the journals a', of the tooth'd roller A, within the slots or recesses b', in combination with the blocks C, and springs C', or their equivalents, when these parts are constructed and operating in the manner substantially as herein described.

79,008.—CHURN.—J. H. Rowe, Fort Wayne, Ind. Antedated June 6, 1868.

I claim a churn dasher constructed in the manner and for the purpose herein specified and described as an article of manufacture.

79,009.—HARVESTER REEL.—William F. Rundell, Genoa, N. Y.

I claim the constructing of the elbows E, of the two longitudinal parts, with bolts passing transversely through the two parts, and also through the arms and beaters, substantially in the manner as and for the purpose herein set forth.

79,010.—EXPLOSIVE POWDER.—F. M. Ruschhaupt, New York city. Antedated June 4, 1868.

I claim the use of napthaline, in a manner as described and for the purpose set forth.

79,011.—CORN-HUSKING MACHINE.—Daniel Sager, New York city.

I claim, 1st, The picker B, when formed as herein described and for the purposes specified.

2d, The husking rollers D D, with their grooves, d d d, as and for the purposes set forth.

79,012.—AUGER.—N. C. Sanford, Meriden, Conn.

I claim two or more cutting lips a b c, of different radial distance from the axial center of the auger, and in different horizontal planes, all constructed to operate substantially in the manner and for the purpose as set forth.

79,013.—MECHANICAL MOVEMENT.—E. W. Sargent, Lowell, Mass.

I claim 1st, The cross head K, constructed as described, and provided with nippers n, and combined with the guide rods g, and belt, H, in the manner and for the purpose substantially as described.

2d, The combination of all the operative parts specified, arranged to operate substantially as and for the purpose set forth.

79,014.—LAMP BURNER.—J. W. Schreiber, New York city.

I claim, 1st The secondary tube D, arranged around the main wick tube B, of a burner, and projecting above the same when said secondary tube is by means of springs a a, that fit under a plate E, projecting from the tube, held and adjusted up and down, as set forth.

2d, Closing the chimney of the lamp burner by means of a perforated plate E, which is held up against a contracted portion of the chimney by means of springs a a, as described, so that all the air will have to pass to the flame through the said plate, E.

3d, A lamp burner consisting of the body A, tube B, and base plate E, springs a, cap G, and spring holders F F, or their equivalents, all made and operating substantially as herein shown and described.

79,015.—TONGUE DEPRESSER AND ATOMIZER.—O. A. Schulz, Chicago, Ill.

I claim the combination of the atomizer and tongue depresser, provided with atomizing tube holder B, guard C, and bottle holder D, arranged and operating in the manner as herein described and specified, or in any other manner producing substantially the same result.

79,016.—RAILROAD RAIL TIE.—W. F. Serjeant, St. Louis, Mo.

I claim, 1st, The holding down cross tie which is constructed with jaws upon its ends which will embrace the rails when said tie is secured to or adapted for being secured to, the wooden bed of the track by means substantially as as described.

2d, A metallic cross tie constructed of one piece of metal with jaws a a, upon its extremities, and with transverse perforations through it, as herein described and shown.

79,017.—TICKET REGISTER.—S. Sichel and S. Feust, New York city.

We claim the combination of the rollers J, plates g, cam I, crank L, spool D, bell G, hammer H, with any suitable train of wheel work, connecting the rollers with the dials of any suitable registering apparatus, all substantially as shown and described and for the purpose set forth.

79,018.—OVEN RACK FOR SHIP STOVES.—F. L. A. Smith, Brooklyn, N. Y. Antedated June 4th, 1868.

I claim 1st, The adjustable box E, containing a meat pan F, suspended on journals a, to uprights A A, all constructed, arranged, and operating substantially as described.

2d, The grooved uprights or standards A A, provided with a series of holes through which a removable pin c, is passed, for sustaining the journals or trunnions a a, of box E, substantially as and for the purpose described.

3d, The application of the bars D, to the frame in which the box E, is suspended, to prevent the tilting or tipping over of the frame within the oven, substantially as set forth.

79,019.—CONNECTING-ROD ADJUSTMENT.—R. D. O. Smith, Washington, D. C.

I claim a connecting rod or pitman, constructed in two parts, and united by the sleeve D, with right and left screws, substantially as and for the purpose set forth.

A washer provided with an inward projecting tongue, M, to be placed between a main and check nut, in connection with a spline N, cut in the screw, substantially as and for the purpose set forth.

79,020.—HOT-AIR FURNACE.—Sidney Smith, Worcester, Mass.

I claim 1st, The shell A, corrugated horizontally, as described, in combination with the deflecting plates C C, substantially as and for the purpose set forth.

2d, The flues E, constructed with corrugated walls e, hollow cones f, substantially as and for the purpose set forth

3d, The deflecting plates C C, or their equivalents, to deflect the upward currents of air against the radiating surfaces of the furnace.

79,021.—STEAM FIRE EXTINGUISHER.—John Souther, Boston, Mass.

I claim 1st, A self-operating fire alarm and extinguisher consisting of the pipes A and H, whistle B, valve C, lever F, and weight E, or their equivalent, all constructed and arranged to operate substantially as herein described.

2d, The pipes A and H, fusible plugs I and J, and valve stem K, constructed and arranged to operate substantially as herein described and for the purpose set forth.

79,022.—GAS STOVE.—J. D. Spang, Dayton, Ohio.

I claim the burner, consisting essentially of the parts m n, constructed as described and operating in the manner and for the purpose set forth.

79,023.—THREAD SHOW CASE.—A. Steward, Plano, Ill.

I claim the show case for containing spools of thread consisting of the ends A, top B, partitions D, stops E, and inclined planes G, substantially as specified.

79,024.—FABRIC FOR COVERING HORSE COLLARS.—Eugene Sullivan, New York city, assignor to the American Horse-Collar Co., Boston, Mass

I claim the within-described improved elastic water-proof covering for the bearing surfaces of horse collars.

79,025.—FARM GATE.—Abner Taylor, New Hartford, Conn.

I claim the gate A, posts B B' rail C, bar d, rod e, the whole being constructed and arranged as and for the purpose described.

79,026.—CALENDAR CLOCK.—W. A. Terry, Bristol, Conn.

I claim 1st, The use of thirty-two teeth in the month wheel instead of thirty-one, substantially as herein specified.

2d, The use of a month wheel with a year wheel, or four years' wheel, revolving together upon a common axis, and so arranged that the year wheel or four years' wheel shall change its relative position to the month wheel one tooth or division at a certain point in each revolution, substantially as herein described.

3d, The combination of the disk A, with the wheel C, the pawl, a a', the wheel D, and the pinion g, or its equivalent, constructed and operating substantially as described.

4th, The disk A, in combination with the pointer B, so arranged that the same pointer shall indicate the month and the day of the month, substantially as described.

79,027.—IMPLEMENT.—Augustus Thayer, Albany, N. Y.

I claim the implement consisting of the parts A A', having the head B, tack holder D, roughened surfaces b b' c c' d e f, notches j l, holes k n, cutters i i, grooves o, projections n, saw set p, screw driver k, and claw g, all constructed and arranged to operate substantially as and for the purposes herein shown and described.

79,028.—SUBTERRANEAN WALL.—Max Thode, Mattoon, Ill.

I claim in the formation of subterranean structures, the employment of double walls, e g, with the space between them filled with pitch, m, or asphaltum or other impervious material, to be melted and poured therein as the walls are built up; and a bottom formed by the layers b d, with a layer of pitch or asphaltum m, between them, all constructed and arranged as described, for the purpose specified.

79,029.—CAR WHEEL.—W. R. Thomas, Catasauqua, Pa.

I claim a cast metal car wheel provided with the hollow enlargement A, hollow arms B, communicating with the same, and the in-turning thin metal webbing, all constructed and arranged substantially as and for the purpose described.

79,030.—MACHINE FOR GRINDING MOWING MACHINE KNIVES.

John A. Thompson, Auburn, N. Y.

I claim, 1st, Providing the bar C, with the rollers L, and the clamps K, provided with the rollers, J, substantially as described.

2d, In combination with the bars C and C', connected by the jointed links b, the plates A and D, constructed and arranged to operate as set forth.

3d, The bar C', connected to the index plate A by the jointed links b, and the levers E and E', substantially as represented in figs. 6 and 7 and 8.

4th, In combination with the apparatus constructed as last above described, arranging the bar C, to slide longitudinally thereon, for the purpose of moving the sickle along without changing the position of the frame, as set forth.

5th, The auxiliary stone, R, when arranged to be adjusted on either end of the shaft, for use in connection with the main stone, P, substantially as and for the purpose set forth.

79,031.—MACHINE FOR CLEANING THE INTESTINES OF SLAUGHTERED ANIMALS.—John A. Thompson, Bucyrus, Ohio.

I claim, 1st, The cleaning of the intestines of animals by revolving brushes, substantially as herein described.

2d, The cleaning of the intestines of animals by machinery which operates to draw the intestines through between contiguous revolving brushes, by means of contiguous rollers, substantially as herein described.

3d, The driving wheel a, pinion d, grooved or flanged roller c, gear wheel e, gum roller h, fluted roller, i, and brushes, A A, when arranged, combined, and operated, substantially in the manner herein shown and described, for the purpose set forth.

79,032.—BEVEL AND TAPERING GAGE.—Dennis H. Tierney, New York city.

I claim, 1st, The combination of the slide B, angular bar A, adjustable slide bar C, and adjustable blades c e, all arranged substantially as and for the purpose specified.

2d, In combination with the subject matter of the foregoing clause, the adjustable arm, g, arranged substantially as and for the purpose specified.

3d, The arrangement of the graduated scale plate m, adjustable blade c, and bar A, substantially as and for the purpose specified.

79,033.—WASHING AND WRINGING MACHINE.—Robert K. Tomlinson, Brownsburg, Pa.

I claim, 1st, Imparting an alternate reciprocating motion to each series of upper and lower rollers A A', by means of cams D, and a rotary motion to each roller by the double series of cords, i, when the cords of the upper series are driven from the upper winger roll, and the cords of the lower series from the lower winger roll, as herein described, for the purpose specified.

2d, The cam wheels, D D, in combination with the rubbing surfaces, A A', by which the reciprocal motion to those surfaces is imparted.

3d, The combination of the upper and lower series of rollers A A', cams D, levers P, bar R, double series of cords i, and wringing rolls J, arranged and operating as described, for the purpose specified.

79,034.—STAMP MILL.—Richard Uren and John Walker (assignors to themselves and John Uren), Houghton, Mich.

We claim, 1st, The supplementary cylinders H H' and pistons J J', in combination with the cylinder G, piston F, stamp C, and coupling D, substantially as described, for the purpose specified.

2d, The supplementary pistons J and J', in combination with the yokes K K1 L, stamp C, and coupling D, substantially as described, for the purpose specified.

3d, The rock shaft h, adjustable cams i, fixed cam x, and arm y, in combination with the coupling D, and stamp C, substantially as described, for the purpose specified.

4th, The crank shaft S, cam p, connecting rods W W', and valves O O', in combination with the rock shaft h, cams i x, coupling D, and stamp C, substantially as described, for the purpose specified.

5th, The bracket R', lever j, and floats l, in combination with the cam i, stamp, C, and coupling, D, substantially as described, for the purpose specified.

6th, The horizontal shaft a, cam b, valve 2', and valve rod d, in combination with the coupling D, substantially as described, for the purpose specified.

7th, The combination of the spring bed 23, rod m, spring n, spring catch o2, tappet p, arms, Y u, and spring t, substantially as described, for the purpose specified.

79,035.—CHURN.—W. H. and L. Waddell, Churchville, Va.

We claim the combination of the wheel, roller, and lever beam, as above described, for the purpose of operating the common churn.

79,036.—MACHINE FOR FORMING LAMP TUBES.—Wm. Wallace, Ansonia, Conn.

I claim the arrangement of the two bars a and b, their outer edges parallel to each other, or nearly so, so as to receive the cylindrical tube, and combined with a device to force the said bars, so as to flatten and form the tube, substantially in the manner herein set forth.

79,037.—SEWING MACHINE.—Enos Waterbury, Stamford, Conn.

I claim the combination of the pivoted right-angular arm M, pin J, slotted carriage G, and shuttle driver K, substantially as described, for the purpose specified.

79,038.—CORN PLANTER AND SEED DRILL.—Jacob Weaver, Elizabethville, Pa.

I claim, 1st, The seed tubes and cultivator bar or frame I, provided with the teeth J, in combination with the frame A, lifting lever L, and seed wheels or rings E, all arranged and operating as described.

2d, The arrangement of the rag wheel or ratchet b, on the axle, in combination with the toothed lever or brake b', operating as described.

79,039.—LAMP SHADE.—Alfred M. Weekes, New York city.

I claim providing the lamp shade with one or more elongated projections a a, substantially as and for the purpose herein shown and described.

79,040.—WIRE SPRING MATTRESS.—Franz R. Wegman, Saxony, assignor to himself and Tobias Kohn, Hartford, Conn. Patented in Saxony March 6, 1865.

I claim, 1st, A mattress or cushion composed of spiral wire springs, braided or linked together in two or more series, so as to form one connected web of woven wire, substantially as herein described.

2d, The combination of the struss H H, with a mattress of wire springs, substantially as described, for the purpose of stretching it and rendering it more elastic.

79,041.—STOVEPIPE DAMPER.—D. A. White, Chagrin Falls, O.

I claim the herein described stove damper, consisting of the convex disk A, and deflectors B, constructed and arranged in the manner as and for the purpose specified.

79,042.—HARROW.—F. R. Wilson, Columbus, Ohio.

I claim the arrangement of the outer rails A A, and inner rails B B, and the grooved teeth-holding blocks K K, pivoted in the manner described, and the perforated bars D D, when the several parts are constructed and operated substantially as specified.

79,043.—INKING APPARATUS FOR COLOR PRINTING.—George W. Wood (assignor to himself and James W. Slater), Richmond, Ind.

I claim, 1st, The combination of the reciprocating bed, B, ways, C, adjustable tablets, D D1 D2, and rollers, G G1 G2, substantially as described.

2d, The combination of the reciprocating bed, B, and roller frame, F, so connected by intermediate mechanism that the movement of the former shall communicate motion to the latter in an opposite direction, substantially as and for the purpose set forth.

79,044.—PNEUMATIC GRAIN ELEVATOR.—S. W. Wood, Cornwall, N. Y.

I claim the combination and arrangement of the atmospheric conveying pipe or passage, A, exhaust chamber, B, and pump or blower, C, substantially as and for the purpose herein specified.

In combination with the foregoing, the self-acting discharge valve, D operating substantially as and for the purpose herein set forth.

Also, the additional chamber, H, and discharge valve, I, alternating with the valve, D, substantially as and for the purpose specified.

Also, the contracted aperture, o, of the receiving nozzle, for the purpose specified.

Also the combination of a pneumatic pipe or passage, for conveying grain with a mechanical grain elevator, as herein specified

Also, the curved or bent discharge nozzle, g, arranged in combination with the discharge pipe or spout, so as to distribute the grain by its own gravity substantially as herein specified.

79,045.—PRINTERS' INK.—Charles Wulsten, Lafayette, Ind.

I claim an ink, for all the purposes for which printers' ink is used, in which the silicate of alumina, white clay, or Jersey clay, or kaolin, prepared with sulphate of zinc, and with or without dilute sulphuric acid, is partially substituted for lamp black, blue, green, or other coloring matters, with drying materials and varnish, prepared as and in the proportions substantially as shown and described, and for the purposes set forth.

79,046.—SASH FASTENER.—Francis Zell, Louisville, Ky.

I claim, 1st, The spring, D, so attached to the spring belt, B, that when the latter is retracted it shall be retained in its retracted position, but be partially projected from its casing by the movement of the sash, so as to be brought against a projection, released, and thrown into the socket when the sash is closed, substantially as and for the purpose set forth.

2d, The pivoted handle, F, provided with a projection or finger, f, for locking the bolt, and operating in the manner and for the purpose explained.

79,047.—SHUTTER FASTENER.—Francis Zell, Louisville, Ky.

I claim, 1st, The fastening device, consisting of the successive cylindrical portions C C1 C2, the thumb piece C3, and shouldered head C4, in combination with two matched retaining plates, substantially as and for the purpose set forth.

2d, The plates, D D, constructed with slots having diverging sides, and with corresponding projections, d d, substantially as and for the purpose set forth.

REISSUES.

2,984.—BEE HIVE.—James M. Bebee, Casadaga, N. Y. Patented November, 12, 1867.

I claim, 1st, The combination and arrangement of the out case, A A', ventilating board, H, inner hive, and packing material, J, substantially as and for the purpose set forth.

2d, Securing the said comb frames together by means of a wire bail, b, and wedge, e, in the manner shown and described.

2,985.—BRICK MACHINE.—Helmuth Dueberg, New York city. Patented November 26, 1867.

I claim, 1st, The channel, F F', extending in opposite directions from the tapering spour, E, and carrying the compressed clay to the reciprocating table, H, substantially as and for the purpose set forth.

2d, The feeder or pusher, K, in combination with the forming dies, F F', and molds, I I', substantially as and for the purpose set forth.

3d, The rocking lever, M, carrying the followers, L L', and operating in combination with the reciprocating table, H, molds, I I', and press boxes, G G', substantially as and for the purpose described.

4th, The recesses, h, in the press boxes, G G', to allow the surplus clay to escape as set forth.

5th The pieces of flannel, or other absorbent material, supplied with oil from cups, m, in combination with the reciprocating table, H molds, I I', and followers, L L', constructed and operating substantially as and for the purpose described.

2,986.—GRASS HARVESTER.—Jonathan Haines (assignee, by mesne assignments, of himself), Pekin, Ill. Patented Sept. 4, 1855. Reissued April 13, 1858. Division D.

I claim, 1st, The two longitudinal ways or rails, o o, located between the two driving and supporting wheels for the purpose of supporting the driver's seat, substantially as set forth.

2d, The use of an adjustable seat for the driver, when said seat is mounted upon two longitudinal rails or ways, or their equivalents located between two driving and supporting wheels of a jointed finger-beam machine, so that the driver can, at pleasure, shift his seat backward or forward, to enable his weight to balance the machine, substantially as set forth.

2,987.—HORSE HAY FORK.—Samuel Harris and Daniel A. Harris, Shippensburg, Pa. Patented April 23, 1867.

We claim, 1st, The combination, substantially as set forth, in a horse hay fork of a slotted main bar or shank, A, a lifting finger, C, pivoted centrally in the slot of the shank, and a link rod, D, connecting the finger with a forked lever, E, pivoted to an arm, F, projecting from the shank, and having the tripping rope attached to its upper end, whereby the lifting finger is automatically locked in a horizontal position by the weight of the load.

2d, The combination substantially as set forth, in a horse hay fork, of two parallel rigidly connected shanks, with pivoted fingers, for the purposes specified.

3d, The combination, substantially as set forth, of the parallel shanks, the pivoted lifting fingers, the link rods crossing the shanks diagonally, and the cross bar, A', whereby the load is compressed before being elevated.

2,988.—FRUIT CAN.—Wm. W. Lyman, West Meriden, Conn. —Patented December 28, 1858.

I claim compressing the cover and jar together against an intervening elastic packing ring, located between the lower edge of the flange of the cover and a seat formed below the upper end or edge of the neck or body of the jar, substantially as described.

2,989.—MACHINE FOR MAKING THE BODIES OF CIGARS.—George Moebs assignee, by mesne assignments, of G. Albert Reniger), Detroit, Mich. Patented October 29, 1861.

I claim, 1st, The combination of the aprons, F and H, knife, K, and traveling racks, 12 12, and boxes, 15 15, substantially as described.

2d, The combination of the taper trunk, I I', c c, the aprons, F and H, the throat, J the knife, K, and the revolving boxes, the whole operating together substantially as and for the purpose set forth.

3d, Traveling racks and boxes in combination with boxes for transferring the cut tobacco from the aprons to the traveling boxes, substantially as set forth.

4th The combination of endless aprons, knife transfer boxes or their equivalents, and suitable boxes to receive and keep the cigar bodies until the wrappers are applied.

2,990.—MACHINE FOR PUTTING ON THE WRAPPERS OF CIGARS.—George Moebs (assignee, by mesne assignments, of G. Albert Reniger, Detroit, Mich. Patented Oct. 29, 1861.

I claim, 1st The combination of the roller, H, apron, J and the fixed table, D the whole operating together substantially as and for the purpose herein specified.

2d, The auxiliary roller, I, in combination with the roller, H, substantially as described.

3d, In combination with the table, D, and apron, J, the roller, L, or its equivalent adjusting the slackness of the apron, substantially as described.

4th, The receiving hooks, W, or their equivalents, in combination with the table, D, apron, J and roller, H, for the purpose specified.

2,991.—GANG PLOW.—William B. Ready, Sacramento, Cal. —Patented Dec. 3, 1861.

I claim 1st, The curved beams, A, when used in connection with a gang plow, or a series of plows connected together by cross bars, B B B, constructed and operating as and for the purposes herein set forth.

2d, The arrangement of the arms, G, wheels, I, and lever, J, when attached to the right-hand arms, G, and connected to the central beam, A, as and for the purposes set forth.

2,992.—HAY SPREADER.—E. W. Bullard, Barre, Mass. Patented May 21, 1861.

I claim, 1st, The employment, in a hay spreading machine of mechanism for giving motion to the forks or stirrers, so constructed and combined as to give to the fork or forks, after they have entered the hay to be spread, a sweeping or accelerated back and up motion, until the hay has been properly raised, and then a down or lag motion, for the purpose of disengaging the forks from the hay while the machine is drawn forward by the team, substantially as and for the purposes set forth.

2d, Supporting or sustaining the forks in a hay turning and spreading machine upon fulcra which move in the arc of a circle, while the hay is being acted upon, said forks having also a rocking or backward and forward motion upon said moving fulcra, to aid in lifting the hay, and being disengaged therefrom by means of hinged levers or arms, substantially as and for the purposes set forth.

3d The combination, in an open frame hay spreader, of a series of forks for entering and lifting the hay, and then disengaging themselves from the hay while the team is advancing, substantially in the manner described.

4th, Combining each fork with the spreader frame and the mechanism for operating the fork, by means of three joints or flexible connections, for the purposes set forth.

5th, The combination with each spreader fork of a jointed arm, one end of which arm is hinged, or turns upon a stationary or fixed fulcrum, while the other end is so hinged and combined with the fork as to move and rock the latter upon its moving fulcrum, substantially as and for the purposes set forth.

6th, The combination, in an open frame hay spreader, of a series of forks arranged to alternately enter the hay, lift it from the ground, and discharge it in the air, in rear of the advancing machine, substantially as described.

7th, A double tined fork for a hay turner or spreader, constructed from a single piece of wire, the center of the piece of wire being bent into a loop, and a spring coil formed on each side thereof, with the ends of the wire projecting from the outer ends of said coils, parallel or nearly so, to each other, with backward curves to form the tines, substantially as described.

8th, The combination with the coils of the spreader forks of removable journals or supports, upon which the coils are free to spring, but are not fastened thereto rigidly, whereby the said journals or supports can be easily removed from the fork coils by a lateral movement of the journals or supports, substantially as and for the purpose set forth.

9th, The combination of the turner forks with their handles, so that the strain of holding the tines to their work, while lifting the hay, shall be sustained by the loops of the forks whereby the liability of breaking and bending the tines of the forks during the operation of the machine is lessened, substantially as set forth.

10th, Giving a number of forks, arranged to operate successively, a back and forward motion by means of a crank shaft, to accomplish the purposes above set forth, substantially as described.

11th, The combination in a hay spreader of the following elements, viz: a series of double tined spring forks, to act alternately upon the hay, to lift and discharge in rear of the machine, without the aid of strippers, and an auxiliary frame for supporting the forks from a point in rear of and above the axis of the main supporting wheels, to give room for the proper action of the forks.

12th, The combination in a hay turner or spreader of the following elements, viz: a series of forks arranged to lift and discharge the hay in rear of the machine, without the aid of strippers, as described; a seat for the driver and mechanism for elevating and depressing the forks, the same mechanism being also used for throwing the forks in and out of action, whereby the driver, from his seat on the machine, can elevate or depress the forks, and also throw them in or out of action, substantially as and for the purposes stated.

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2,993.—HORSE RAKE.—Horace B. Hawkins (assignee of Davis B. Woodward), Akron, Ohio. Patented Feb. 19, 1861.

I claim, 1st, The combination, with the free extended ends of the rake teeth of guides which allow the extended ends to rise and fall, and also to move longitudinally, but prevent them from moving laterally, for the purposes stated.

2d, The combination, in a horse hay rake, of curved metal teeth, with their support or fulcrum bar, in such a manner that neither end of the teeth shall be connected to any part of the frame, for the purposes stated.

3d, The combination, in a horse hay rake, of metal teeth, with their main supporting or draft bearings, in such a manner that their upper or forward ends shall extend forward of the draft bearings or fulcrum connections, and serve as springs to keep the lower ends of the teeth down in proper positions for raking and gathering the hay, substantially as stated.

4th, The combination, for the purposes stated, in a horse hay rake, of the following elements, viz: first, a rocking frame, for elevating and depressing the teeth to discharge the hay; second, a series of metal teeth, without coils, having single draft connections or attachments in rear of the forward ends of the teeth; third, a series of bearings for the free ends of the teeth, forward of their draft connections, which admit of an up, down, and longitudinal movement of the extended ends of the teeth during the operation of raking.

5th, A rocking frame in a horse hay rake, having the rear end pieces turned up for supporting the piece which elevates the teeth to discharge the hay in such a manner as to give proper room below it for the accumulating hay to form a windrow, while at the same time preventing the hay from working forward upon the teeth.

6th, The combination, with the raking frame and ratchet wheels, C C, of the cams or eccentric wheels or rings, K K, straps or clasps, ee, bar, J, shaft, L, and lever, M, substantially as and for the purposes set forth,

7th, The combination of the sliding bar, J, with one or both of the ratchet wheels, substantially as and for the purposes set forth.

8th, The combination with the bar, J, and axle, A, of the fingers, n n, and arms, o o, substantially as and for the purposes set forth.

2,994.—HORSE RAKE.—George Whitcomb, Port Chester, N. Y. Patented October 5, 1858.

I claim, 1st, The combination and relative arrangement of the rake head, E, and axle, B, substantially as and for the purposes set forth.

2d, The combination and relative arrangement of the hinged rake head with the supporting axle and carrying wheels, substantially as shown and described, whereby the head is supported above the rear upper edge of the axle, as shown, and the lower ends of the teeth, when gathering the hay, occupy positions in rear of the tread of the wheels, and forward of a vertical plane on a line with the rear edge of the wheels, substantially as shown in the accompanying drawings.

3d, The combination of the rake head, E, thills or shafts, C C, hinges, c, and axle, B substantially as described.

4th, The arrangement of the rake head, E, and foot treadles, H J and G K, or either, in relation to each other and the axle, B, substantially as and for the purposes set forth.

5th, The arrangement of the rake head, E, foot treadles H J G K, and hand lever, I, in relation to each other and the axle, B, substantially as and for the purposes set forth.

2,995.—HORSE RAKE.—George Whitcomb, Port Chester, N. Y. Patented October 5, 1858.

I claim, 1st, The combination with the teeth of an adjustable hay guard, L, or equivalent device, substantially as and for the purposes set forth.

2d, The combination with the teeth of a horse hay rake, of a hay guard which moves with the teeth when the head is raised or lowered, but which permits each tooth to rise and fall to a certain extent, independent of the others, while all the teeth are held from springing laterally from each other, thereby preventing wide, open, and increased spaces between any two teeth for the escape of hay while the rake is in operation.

3d, The arrangement of the upwardly and inwardly inclined seat supports, b b, with the cross piece, a, and angular braces, a' a', substantially and for the purposes described.

DESIGNS.

3,069.—CENTER PIECE.—Henry Berger, New York city.

3,070.—PRINTERS' TYPE.—Andrew Little, New York city.

3,071.—TRADE MARK.—Geo. S. McKenzie, Cleveland, Ohio.

EXTENSIONS.

TRUNK LOCK HASPS.—Conrad Liebrich, of Philadelphia, Pa.—Letters Patent No. 10,862, dated May 2, 1854.

I claim, 1st, The so combining of a spring with a hinged hasp as that the lower or hinged portion thereof shall stand off from the trunk, substantially in the manner and for the purpose described.

2d, The placing of the hasp catch in a solid projection which enters the lock with the hasp catch, and takes all the strain incident upon the tendency of the lid to open, and thus protect the catch itself, substantially as described.

BRIDGES.—Albert Fink, of Louisville, Ky.—Letters Patent No. 10 887, dated May 9, 1854.

I claim the method of combining the different systems of triangular bracings above described, so that a weight coming on one of the systems of the truss, is not only transferred over one or more other systems before it is carried back to the abutments, but the foot of the post in each triangle being unconnected with the tension-rods of the other triangular bracings can settle vertically as well as move to the side, so that the tension rods of each system of the triangular bracings will be strained equally when the bridge settles under the superincumbent weight. This would not be the case if the foot of the post in the second system of triangular bracings rested on the tension-chord of the post in the first system, as heretofore used; and herein consists my improvement, for which I ask letters patent.

MACHINERY FOR CUTTING PAPER.—Nelson Gavitt, of Philadelphia, Pa. Letters Patent No. 10,889, dated May 9, 1854.

I claim the method, substantially as herein described, of adjusting the cutting of sheets from a web of paper, whereby the length of the sheets can be varied by any required proportionate amount of the whole range of variation to which the machine is adapted, however small or however large the same may be, thus rendering it possible, with a continuous feed of the web of paper under an intermittent cutter, to sever the sheets half way or thereabouts between water marks, nearest together at one part of the web than at another.

CLOVER AND GRASS SEED HARVESTERS.—Thomas A. Steadman, of Lyons Mich., administrator of Thomas S. Steadman, deceased.—Letters Patent No. 10,967, dated May 23, 1854; reissue No. 986, dated June 19, 1860.

I claim in combination with the main frame or box, A, and arm, or supplementary frame, F, on which is formed or secured the master wheel axle, the employment of a retaining arc, H, or its equivaleut, the whole constructed and arranged in such a manner that the main frame or box, and arm or supplementary frame, with its master wheel axle, will be held in parallel planes relatively to each other while they are moving up and down, substantially as and for the purposes herein set forth.

CLOVER AND GRASS SEED HARVESTERS.—Thomas A. Steadman, of Lyons, Mich., administrator of Thomas S. Steadman, deceased.—Letters Patent No. 10,967, dated May 23, 1854; reissue No. 987, dated June 19, 1860; again reissued No. 2,009, dated June 20, 1865.

I claim, 1st, The combination of the holding plate, c, or its equivalent, with the shaft of the driving cog wheel's pinion, and that end of the coupling arm or supplementary frame, G, or its equivalent, which is hung and vibrated on said shaft.

2d, The combination or arrangement of the following elements in a harvester, viz, a frame or box, having the cutting apparatus connected to and drawn forward by it, the shaft of the main driving cog wheel's pinion also connected to it, and about at right angles to its forward movement, a coupling arm or supplementary frame, or its equivalent, having one end hung and vibrated on said pinion shaft, and near the other end connected to the main axle of the main driving cog wheel, and holding devices whereby the attendant can have the inner end of the cutting apparatus held at different hights in respect to to the axle of the main driving cog wheel.

3d, Connecting the main bearing and driving wheel of a harvester with the frame to which the cutting apparatus is attached, in such a manner that the attendant can, while riding on the machine, vary the hight of the inner end of the cutting apparatus while the outer end of said apparatus remains unchanged, substantially as described.

4th, The combination of the retaining and guiding arc, g2, or its equivalent, with the axle end of the coupling arm or supplementary frame, H, or its equivalent, the outer end of a harvester's cutting apparatus, and the wheel that carries this outer end, or is nearest to it.

5th, The combination of the axles, f, and d, the wheels, C, and D, the projecting ends of the shaft of the main driving cog wheels pinion, the frame or box carrying this shaft, the coupling arms or supplementary frames, G, and H, the holding plates, c c, and the retaining and guiding arcs, g and g2, or their equivalents.

6th, The combination or arrangements of the following parts or elements in a harvester, a frame or box which carries the shaft of the cutter's main driving cog wheels pinion; a coupling arm or supplementary frame, having the axle of the said cog wheel connected to it, at or near its outer end, and the inner end hung upon said pinion shaft; a holding device by which it is properly held in that place; a guiding and retaining arc attached to the main frame of the machine, and maintaining the supplementary frame or coupling arm in place; cutters driven by a crank motion, and an automatic rake, which, as well as the cutters, receives its motion through the main driving cog wheel's pinion shaft.

7th, Connecting the axle of the cutter's first driving cog wheel, and said wheel's pinion shaft by the coupling arm or supplementary frame, G, or an equivalent thereof, which has one end hung on said pinion shaft, and therefor holds the said cog wheel's axle always at the same distance therefrom, so that the connection of the said cog wheel and its pinion will always remain the same.

8th, The combination of the retaining and guiding arc, g, or its equivalent, with the main frame or box of a harvester, to which the cutting apparatus is secured, and the axle end of the coupling arm or supplementary frame, G, or its equivalent, which has the other end hung on the pinion shaft, connected to the main frame about parallel with the axle of the cutter's ground and driving wheel, so that the said axle and pinion shaft are always at the same distance apart and substantially parallel, and the axle end of said coupling arm free to rise and fall, vibrating on said pinion shaft, while the machine is in motion.

CLOVER AND GRASS SEED HARVESTERS.—Thomas A. Steadman, of Lyons Mich., administrator of Thomas S. Steadman, deceased.—Letters Patent No. 10,967, dated May 23, 1854; reissue No. 985, dated June 19, 1860; again reissued, No. 2,279, dated June 5, 1866.

I claim, 1st, In combination with the main frame of a harvester, an axle upon which the cutter's driving wheel revolves that derives all its connection with the frame through one end, and which end does not cross a vertical plane parallel with and touching the side of this frame nearest to it, a plate from which this axle projects, and a holding mechanism that holds this plate and frame together and prevents any essential variation in the distance between this axle and the cutter's driving pinion shaft, or in their parallelism, while the frame is being raised or lowered in respect to this axle, substantially as and for the purpose set forth.

2d, In combination with the main frame of a harvester, an axle upon which the cutter's driving wheel revolves that derives all its connection with the main frame through one end, and which end does not cross a vertical plane parallel with and touching that side of this frame nearest to it, and a plate from which this axle projects, a holding mechanism which prevents any essential variation in the distance between this axle and the cutter's driving pinion shaft, or their parallelism, while the main frame is being raised or lowered in respect to this axle, and another holding mechanism by which the attendant is enabled to have this main frame held at different hights in respect to this axle, substantially as and for the purpose set forth.

3d, In combination with the main frame of a harvester, an axle-plate, which is connected with one end of the axle of the cutter's driving wheel, said plate being wholly between the plane of said wheel and a plane parallel with and touching that part of said frame nearest to said wheel, a holding mechanism which prevents any movement of this plate other than its movement in the arc of a circle concentric to the axis of the shaft of the cutter's driving pinion, and a holding mechanism having one portion further forward than the axle of the cutter's driving wheel, and another portion further back than said axle, between each of which and the frame is a portion of said plate, and by which said plate is held to the frame while it is being raised or lowered in respect to said axle, substantially as and for the purpose set forth.

MACHINERY FOR COMPOSING TYPE.—William H. Mitchel, of New York city.—Letters Patent No. 10,929, dated May 16, 1854.

I claim, 1st, The combination of the lip, 51, with the lifting bar, 52, and with the bar, 50, as specified, the said lip, 51, acting as a stopper against which the line of the type lies in the inclined conductor and over which the bar, 52, lifts the bottom type so that it falls on the bed, m, as specified, and the said bar, 50, being so adjusted as only to admit of one type at a time being lifted as specified.

2d, I claim constructing the composing wheel of thin circular plates with teeth therein, so as to receive the type from the conductor, q, in combination with the plates, 53, which pass between the circular plates and receive the the type, preventing their further descent, and passing them in line into the groove, as specified.

3d, I claim the tongue, 57, to prevent the type jumping over the teeth in the composing wheel as they pass down the inclined conductor, as specified.

MACHINE FOR SAWING THIN BOARDS, ETC.—John Meyers, and Robert G. Eunson, of New York, city.—Letters Patent No. 10,965, dated May 23, 1854.

We claim, 1st The employment or use of the deflecting plates, E E', one or both placed at the side of the saw, as herein shown, for the purpose of preventing the sawed stuff from bearing against the side of the saw and expanding the saw kerf, and also for the purpose of allowing a thin veneer saw to be stiffened by the plates, D, one or two as desired.

2d, We claim the employment or use of the clamps, I I, arranged as herein shown, or in an equivalent way, so as to have a lateral elastic movement independent of the roller beds, to which said clamps are attached, for the purpose of compensating for the varying thickness of different pieces of stuff and keeping them in proper relative position to the saw.

3d, We claim the knives or cutters, O O, placed in the roller beds, F F, and arranged substantially as herein shown and described, and for the purpose set forth.

4th, We claim the employment of an adjustable bed, F, with clamps, as described, in combination with the saw, C, when the saw has a stiffened plate, E, in line with said bed, by which the stiffened or rounded side of the saw is made the "line side."

HAY ELEVATING FORKS.—Thomas T. Jarrett, of Horsham, Pa.—Letters Patent No. 10,989, dated May 30, 1854; reissue No. 1,939, dated April 18, 1865.

I claim, 1st, The employment or use of a weight on the cord attached to the catch, which shall operate to discharge the hay from the fork at any desired hight, substantially as and in the manner described.

2d, The combination of one or more pulleys with a hay elevating fork, for the purpose described.

3d, The pulley, J, at the back part of the head, operating as and for the purpose described.

4th, Securing the handle or bail to the head by means of loop eyes, which are secured to the head and project therefrom.

5th, Securing the tongue or brace lever to the handle or bail by means of a spring-catch attached to the said handle or bail, for the purpose described.

6th, A spring catch turning upon a pin or bearing, the functions of which are to keep the tines or body of the fork in position to retain the load to discharge it whenever desired.

7th, In hay-elevating forks, I claim the combination of the tines, the wooden head, the tongue or brace-lever, and the spring-catch.

8th, The combination of a spring-catch with a rigid tongue, or brace-lever, extending from the piece which receives the tines, for the purpose described.

MACHINE FOR MAKING HINGES.—Edward Brown, of Waterbury, Conn.—Letters Patent No. 10,943, dated May 16, 1854.

I claim, 1st, The slides, G G', regulated by set-screws, substantially as described.

2d, I claim the eccentric-rods, E E', sliding within the hollow rods, F F', and connected with the slides, G G'.

8d, I claim the sliding punching, J J', with adjusting-screws, arranged as set forth.

4th, I claim the sliding gage, O, with its longitudinal motion and set-screws, for the purpose of securing the hinges while turning the knuckle, in the manner substantially as set forth.

5th, I claim the fast gage, S, with the preventer, r.

6th, I claim the slide, P, with the catchers, v, and the spring-catchers, w w', 7th, I claim the gage, U, in combination with the preventer, r', for the purpose of preventing the hinge from returning with the feeding-slide, the whole being arranged and combined in the manner set forth, or in any other manner substantially the same.

GRINDING-MILLS.—Edward Harrison, of New Haven, Conn. Letters Patent No. 11,040, dated June 6, 1854; reissue No. 625, dated November 16, 1858.

I claim the improved method described of securing the runner-stone on the driving-spindle in a grinding-mill, by means of a metallic band or its equivalent, embracing the periphery of the stone by combining said band with a hub, and a back-plate of at least as great diameter as the runner, and rigidly attached to the spindle, such combination operating to secure the stone firmly in its place, in the manner and on the principle substantially as specified.

CLAPBOARD JOINTS.—William Baker, of Utica, N. Y.—Letters Patent No. 10,903, dated May 16, 1854; reissue No. 1,541, dated September 22, 1863.

I claim, 1st, The construction of the joint of clapboards, or jointed siding for houses, and other buildings, in such manner that the boards when laid on the frame shall lie flat and solid for their whole width against the frame of the building, and at the same time shall preserve the appearance and advantage of clapboarding in front by the outer lip of the upper board at each joint overlapping outside the board next below it for shedding the water, as described.

2d, I claim the combination of the lock, a, in the rear of the joint for holding the board to the frame at the lower edge, as described, with the extended lip, C, (fig. 1), in front for covering the head of the nail, as described, the whole being constructed, combined, and arranged substantially in the manner and for the purposes herein set forth.

MACHINES FOR STICKING CARD-TEETH.—George W. Coats and James Russel, of Springfield, Mass.—Letters Patent No. 11,434, dated August 1, 1854.

We claim the mode of imparting the intermittent motion to the main carriage for spacing the teeth, and reversing the same by means of the screw leader attached to the main carriage, and passing through a nut mounted in suitable boxes, and rotated by cog-gearing as described, when this is combined with a clutch operated by a cam to clutch and unclutch the wheel which receives motion from the wheel or wheels on the main shaft, and imparts the required and measured intermittent motion to the nut, substantially as and for the purpose specified.

We also claim, in combination with the mode described of imparting the spacing motion to the main carriage, the employment of the cams on the main carriage, which, at the end of each traverse motion, act on a lever connected and combined with and operating the clutch to clutch and unclutch the wheel which receives motion from the main shaft to operate the shifting wheel which operates the double clutch on the main shaft, substantially as and for the purpose specified.

We also claim, in combination with the mode described of operating the main carriage, the mode of operating the second carriage which holds the sheet of leather to determine the space between the rows of teeth by means of the shifting cam called the twill cam, and the shifting sector cog wheel which in turn imparts motion by the cog wheels and shaft to the cog wheel through which passes the feathered shaft mounted on the main carriage, and which in turn imparts the required motion to the drums for lifting the second carriage at the end of each complete motion of the main carriage.

And in combination with this, we also claim, making the nut on the screw leader in two parts, divided by a plate at right angles to the axis, when the two parts are attached together so that they can be turned on each other, substantially as described, so that the threads can be set to any wear of the threads, and thus avoid end play, as described.

We also claim making the arbors of the two rollers with cylindrical bosses to determine their distance apart, in combination with the mode of mounting them between boxes and without interposed boxes, the said arbors being prevented from having end play by means of V-shaped or curved fillets on the arbors fitted to corresponding cavities in the boxes, substantially as and for the purpose specified.

We also claim mounting the bending fingers in the sliding top plate, independent of and below the slide or carrier of the former, around which the teeth are bent, the said carrier being provided with an inclined plane or cam, acted upon by a like inclined plane or cam, on the top plate of the fingers, substantially as described, so that when the fingers are drawn back the former shall be lifted up preparatory to its back motion, as fully set forth.

HOT-WATER APPARATUS.—John Brown, New York city. Letters Patent No. 10,982, dated May 30, 1854; reissue No, 321, dated Aug. 14, 1855.

I claim connecting the ends of the horizontal, or nearly horizontal water pipes of a hot water warming apparatus by means of return bends, or elbows of less caliber, and entering within the end or ends of such pipe or pipes, substantially as and for the purpose specified.

And I also claim making each horizontal, or nearly horizontal pipe, having the bend or elbow at one end of reduced caliber, with the calibers at top in the same line, substantially as and for the purposes specified, whether made in one piece, or the bend or elbow separate, and then united, the said elbow being connected with the next pipe above it by entering the end thereof, substantially as and for the purposes specified.

And I claim the construction and arrangement of the apparatus for the purposes and substantially as specified.

VESSELS FOR HOLDING LIQUIDS.—Julia M. Colburn, Baltimore, Md., administratrix of James Stimpson, deceased. Letters Patent No. 11,819, dated Oct. 17, 1854.; antedated April 17, 1854.

I claim the double-wall pitcher, the same consisting in a pitcher with double sides, double bottom, and a hinged cover, from which the liquid contents are to be poured through or over a nose or lip, substantially as herein set forth.

I claim the employment of a chain or string attached to the hand and lid of the pitcher, as described.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

1,388.—METHOD OF PREPARING AND REFINING GLUE.—Andrew Dietz, New York city. April 28, 1868.

1,399.—MACHINERY FOR NICKING AND DRESSING THE HEADS OF SCREW BLANKS.—John Howard, New York city. April 29, 1868.

1,405.—PRESERVING MEAT.—Chas. E. Richardson and Geo. T. Waterman, Boston, Mass. April 29, 1868.

1,406.—MACHINERY FOR MAKING CUT NAILS.—Cyrus D. Hunt, Fairhaven, Mass. April 29, 1868.

1,420.—MACHINERY FOR SPINNING FIBROUS MATERIALS.—Charles J. Harris, Warren, R. I., and Edwin H. Bugbee, Killingly, Conn. April 30, 1868.

1,525.—COMBINATION TYPE, AND CASES TO CONTAIN THE SAME.—WM. H. Wilkinson, Southwick, Mass. May 9, 1868.

1,538.—NAIL MACHINE.—Jacob B. Kingham, Dorchester, Mass. May 11, 1868.

1,539.—MACHINE FOR SEWING BOOKS.—Amos Holbrook, Jr., Lynn, Mass. May 11, 1868.

1,537.—DEVICE FOR HOLDING SCRUBBING BRUSHES.—T. J. Strong, Brooklyn, N. Y. May 11, 1868.

1,544.—FAN.—Otto Brück, New York city. May 12, 1868.

1,557.—RASP.—Hiram Nickerson, Boston, Mass. May 13, 1868.

1,566.—SUSPENDERS.—A. H. Jacobs, New York city. May 13, 1868.

1,568.—AXLES AND AXLE BOXES.—J. Finlay, New York city. May 13, 1868.

1,580.—FELT HATS.—Wm. B. Lodge and Hiram Flatner, Danbury, Conn May 14, 1868.

1,581.—STEAM ENGINE.—Kellogg H. Loomis, New York city. May 14, 1868,

1,598.—LIQUID METER.—Joshua Mason, Paterson, N. J. May 15, 1868.

1,602.—EMBALMING OR PRESERVING DEAD BODIES.—Chas. A. Seely, C. J. Eames, W. R. C. Clark, and Mary L. Booth, New York city. May 15, 1868.

1,609.—APPARATUS FOR COOKING, BOILING, MELTING, AND EVAPORATING PURPOSES.—Sarah E. Saul, New York city. May 16, 1868.

1,693.—FURNACE FOR OXIDIZING LEAD OR MANUFACTURING LITHARGE.—Clarence Delafield, Factoryville, N. Y. May 22, 1868.

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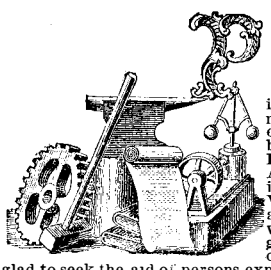

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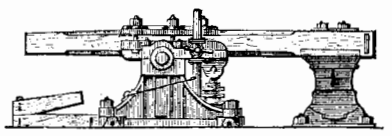

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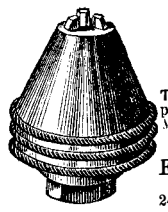

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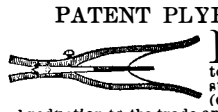

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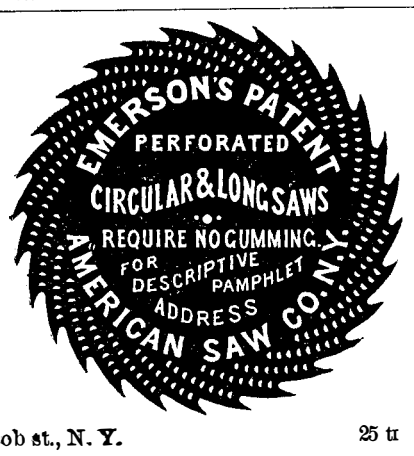

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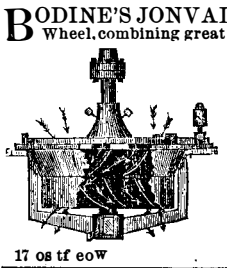

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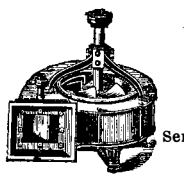

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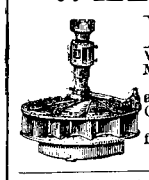

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